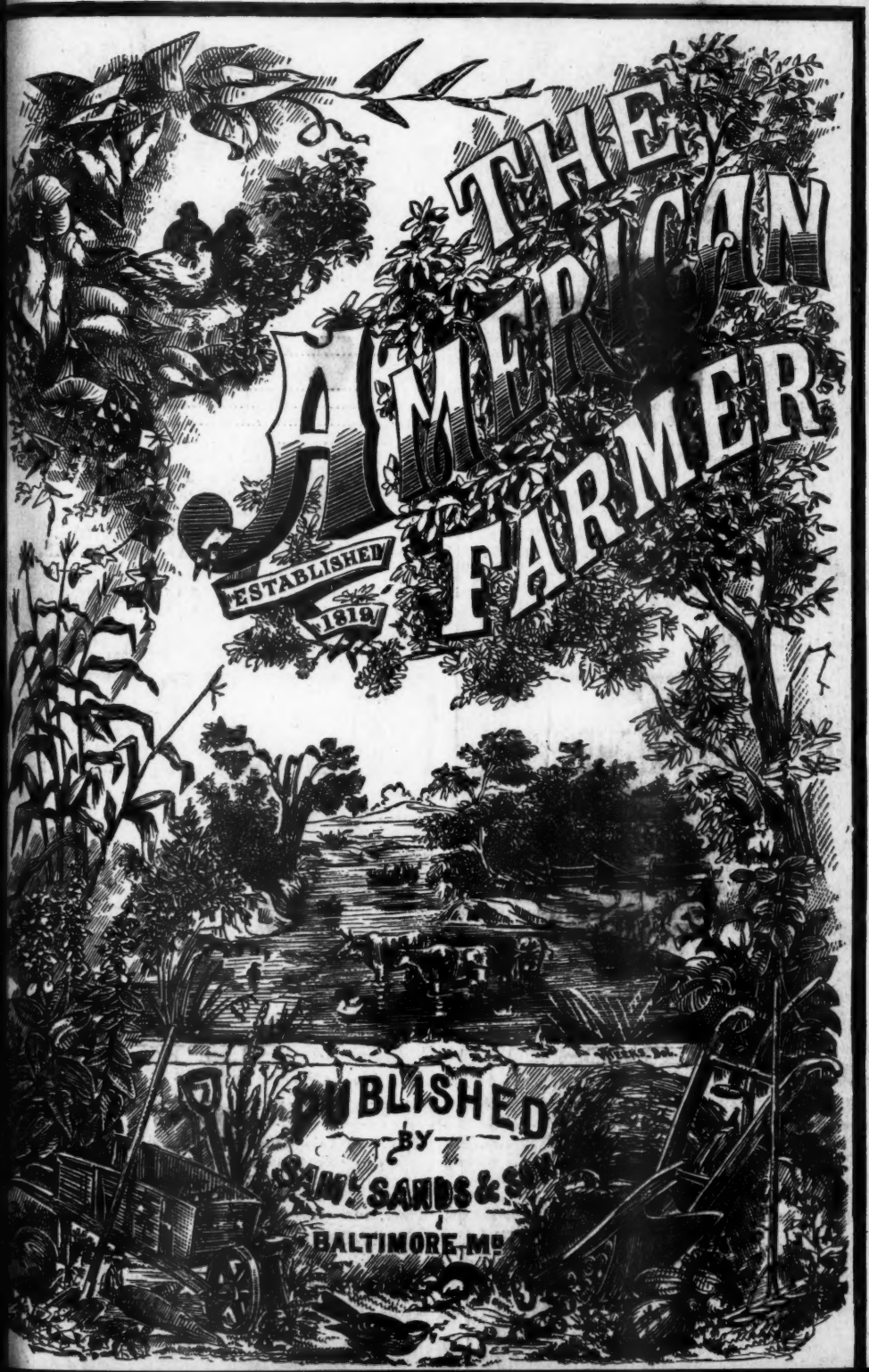
APRIL, 1876.


THE
AMERICAN
FARMER
ESTABLISHED
1819
PUBLISHED
BY
SAM'L SANDS & SON
BALTIMORE, MD

TO FARMERS AND GARDENERS.

$1,000 REWARD TO ANY ONE that can find by analysis or otherwise any adulteration whatever in our manufacture of Bone.

No heavy Bones taken out for Bone Black, or other purposes.

The First Manufacturer in America that sold GROUND BONES by WEIGHT.

PURE BONE DUST AND

BONE MEAL

from Slaughter-house Bones, twenty-five years the standard for purity and excellence.

CHEMICAL LABORATORY OF P. B. WILSON, No. 32 SECOND STREET, BALTIMORE, July 30, 1878.

Joshua Horner, Jr.—Dear Sir: The following is the result of analysis of a sample of your Bone Dust drawn by myself from a lot of seven tons lying in your warehouse:

Moisture, (deter. at 212° F.)	3.74 per cent.
Organic Matter	40.12 per cent.
Containing—Nitrogen, 4.08; Ammonia 4.95.	
Inorganic Matter	56.14 per cent.
Containing Phosphoric Acid	24.52 per cent.
Containing Bone Phosphate of Lime	53.52 per cent.
Insoluble Matter	2 51 per cent.

This is the BEST SAMPLE OF BONE DUST I CAN FIND IN THE MARKET, and call your especial attention to the LARGE PERCENTAGES OF VALUABLE MATERIAL for the improvement of the soil, and to the SMALL PERCENTAGES of moisture and insoluble matter.

Respectfully, etc., P. B. WILSON, *Analytical and Consulting Chemist.*

PREPARED FOR DRILLING, AND PACKED IN BAGS, 167 LBS. EACH, AT $42 PER TON. DISSOLVED OR VITRIOLIZED BONE, $43 PER TON. BONE ASH, GROUND AND DISSOLVED, $42 AND $48 PER TON. FARMERS' SUPPLIES.

JOSHUA HORNER, JR. & CO.

54 S. Gay Street, 178 Forrest Street and Corner Chew and Stirling Streets, BALTIMORE, MD.

Sands' Farmers and Planters' Agency.

Offering as heretofore to purchase and ship for our friends

All Kinds of Fertilizers, &c.

we also call attention to our facilities for the selection and forwarding of Every Description of

Agricultural Implements and Machinery,
Portable Steam Engines and Boilers,
Saw and Grist Mills, &c.,
Wagons, Carriages, Buggies, &c.

Likewise

FRUIT AND ORNAMENTAL TREES, SHRUBS AND PLANTS; FIELD, GARDEN AND FLOWER SEEDS.

ALL KINDS OF FARM SUPPLIES.

We also offer to select and have shipped

IMPROVED LIVE STOCK,

CATTLE, HORSES, SHEEP, SWINE and POULTRY. In this Department we buy only from breeders of established reputation of the several kinds, and cannot undertake to procure ordinary farm stock, such as draft horses, milch cows, &c. In this vicinity great attention is paid to some particular breeds of stock, and specimens can be had here which are nowhere to be surpassed.

As in all transactions we operate for the purchaser, our terms must necessarily be

CASH (or its equivalent.)

Sam'l Sands & Son,

EDITORS AND PUBLISHERS AMERICAN FARMER,

No. 9 North St., Baltimore, Md.

Edwards—Hawkins

THE

AMERICAN FARMER.

"O FORTUNATOS NIMIUM SUA SI BONA NORINT
"AGRICOLAS." . . . . . *Virg.*

PUBLISHED BY SAML. SANDS & SON, BALTIMORE, MD.

VOL. V.—No. 4.] APRIL, 1876. [NEW SERIES.

Chemical Manures and the Wheat Crop.

[CONTINUED FROM AMERICAN FARMER FOR MARCH.]

Messrs. Editors American Farmer:

The next question is, do our soils need potash? In determining this question we must refer back to the basis of our soils. As before observed, feldspar constitutes the main basis of our soils, it being found in quantities more or less abundant throughout all the tobacco-growing region of Virginia. Feldspar contains about 17 per cent. of potash, and the inevitable conclusion is that our virgin and fresh soils at least contain ample supplies of potash; but as many of our soils have been run down by the excessive cultivation of tobacco, which draws heavily upon the potash of the soil, we may readily conclude that all such soils do need potash, and all fertilizers to be applied to them, more particularly when cultivated in tobacco, should be rich in potash.

Fruit culture also requires large supplies of potash; and when we see our orchards beginning to fail, and the fruit to rot, it affords unmistakable evidence that they need potash. This is proven by a fact well known to all fruit-growers, that wood ashes are the very best manure for fruit trees. Ashes, as everybody knows, contain a great deal of potash.

The two remaining elements, nitrogen and phosphorus, or phosphoric acid, are the last to be considered. They are the most important of all the elements of plant food. It is these mainly that we have to deal with, and it is in these mainly that all of our soils are deficient, and more particularly our worn-out soils. Not that all of the fourteen elements are not equally necessary, for the plant will not grow in the absence of a single one of them; but that nearly all of them are abundantly supplied by the soil and the atmosphere, and that the practical farmer need not concern himself very much about them.

Of all the elements, nitrogen is the most costly and difficult to be obtained. It constitutes one of the most important ingredients of animal food,—its most particular work being to build up the sinews, nerves and tendons of the animal organism. It is nitrogen that imparts activity, vigor and full development to vegetable life, and when applied in sufficient quantities it imparts to the foliage of plants a richness of color and a luxuriousness of growth that approaches almost the marvelous.

Although nitrogen in the free state is one of the most abundant substances in nature—constituting as it does, 77 per cent. of the bulk of the atmosphere—yet it is furnished to plants very sparingly. The leading characteristic of nitrogen is its indifference towards other elements. In other words, unlike oxygen, it is an inactive element, and has no very strong affinity for other elements. Generally nitrogen is not supplied to vegetation in the free or primary state. This is done mainly through its compounds. There is a certain class of plants, however, that do assimilate the free nitrogen of the atmosphere. These are called the leguminous plants, such as peas, clover, lucerne, &c. But of these I will speak more particularly hereafter. Nitrogen unites chemically with other elements and forms a number of differing compounds. It thus unites with oxygen, forming nitric acid. It unites with hydrogen and forms ammonia. Nitric acid with soda forms the nitrate of soda, or saleratus. And it unites with potash, forming the nitrate of potash, or saltpetre, and so on with other elements.

Nearly all of the chemical manures manufactured here are supplied with nitrogen by the two first compounds mentioned, viz: nitric acid and ammonia. In Europe the nitrate of potash and the nitrate of soda are mainly used for that purpose. These compounds yield about 14 per cent. of nitrogen. Ammonia yields 83 per cent. of pure nitrogen.

Nitric acid and ammonia are formed mainly in the soil from the decomposition of organic or vegetable matter. Ammonia is also formed in very small quantities in the atmosphere. It is estimated that the atmosphere will supply about 9 pounds per year to the acre. Ammonia is not absorbed directly from the atmosphere by plants, like carbonic acid. It is first carried down into the soil by the dews and rain, from whence it is taken up by the roots. Ammonia is very soluble: that is, it is very easily dissolved by water, and this is one reason why it acts so powerfully upon vegetation. Just as soon as it is incorporated with the soil it is available for

plant food, provided a sufficient amount of moisture is present in the soil to dissolve it. On the contrary when coarse unfermented manures are applied to the soil they have first to undergo the process of decomposition, by which the nitrates are formed, before they go to feed the plant. It would be much better if farmers would take steps to have their manures thoroughly fermented and decomposed before they are applied to the soil, or they should be applied in advance of the growing season, in order that the necessary decomposition may be completed or at least in progress, and the nitrates formed in time to feed the growing plant.

Plants do not take up their food from the soil in the solid state. This is done altogether in the liquid state, and hence the absolute necessity of water in the soil in order to dissolve both the organic and the inorganic elements, and put them in condition to be assimilated by the plant. Water has a wonderful power in dissolving solid matters, both organic and inorganic. Even the hardest mineral may be gradually dissolved by the action of water. Take for an example the hardest quartz or flint rock, or even glass. Whilst in large masses no perceptible impression seems to be made by the action of water; but take a piece of it and powder it into small particles,—put these into a bottle with water and agitate it for an hour or two; then take it out and weigh it, and it will be found that the mass has lost in weight. A portion of it has been dissolved. Let the water stand a while and a precipitate will be found at the bottom of the vessel, consisting of solid matter, which, upon being weighed, will amount to precisely what the pulverized rock has lost. All water contains more or less carbonic acid, and it is this substance mainly that imparts to water its solvent properties. Water, however, in many instances is a very slow solvent, and there are some substances that are not affected by water at all, and when this is the case acids have to be used. For instance, in the manufacture of the super-phosphate of lime, which is done from bones, sulphuric acid has to be employed to dissolve the bones. Some of these acids possess the most wonderful properties for dissolving metal and mineral substances. The roots of plants secrete a species of acid which enables them to dissolve and appropriate the mineral elements of the soil to some extent. The gastric juice of the stomach is an acid which dissolves the food taken into the stomach, and thus promotes the important office of digestion.

Phosphorus is one of the essential elements of plant food, and animal food as well; its more particular province being to build up the bone of the animal organism. Phosphorus unites chemically with oxygen and forms phosphoric acid, and this most valuable and important substance is usually furnished to plants through the application of the super-phosphate of lime. Phosphorus is also found in the soil in a state of combination with other minerals, and phosphoric acid is also supplied from this source in all soils, and in quantities more or less.

There are two kinds of phosphates, the one called mineral phosphates and the other bone phosphates. Chemists say that they are similar in value and properties, but the bone phosphate is generally preferred.

Phosphoric acid is an element of the utmost importance, and secondary to none save nitrogen. It is more abundant and cheaper than nitrogen, but it is by no means inexhaustible. On the contrary its supply in the soil may be very easily exhausted; for the bone-making element scarcely ever finds its way back into the soil except by artificial means.

About 40 years ago the average yield in wheat of the soils of England had been run down to about 12 bushels per acre. This state of things becoming alarming, scientific men went to work to discover the cause of the decline, and they found that their soils had become in a great measure exhausted of the phosphates. They at once went to work to remedy the evil by supplying artificially the needed supply of the phosphates. Since that time they have ransacked the whole civilized world for bones; and the result is, that they have restored the fertility of their soils, and run up their average yield of wheat from 12 to 28½ bushels per acre.

Among practical farmers the question is frequently asked: Which of these two elements—that is, the nitrates or the phosphates—do our lands mostly need? From what has been said, it is very clear that they almost universally need both; and this is more particularly the case with all of our lands that have been long in cultivation. Their excessive cultivation in our leading crops,—corn, wheat, and tobacco, without any ameliorating crops,—has had the effect of robbing them of nearly all the organic or vegetable matter necessary for the formation of the nitrates. If we can procure a fertilizer bearing the necessary per centage of these two fundamental elements, we need not be concerned very much about the balance. Many of our soils doubtless need potash, and when needed it should be supplied; but there is no mistake about the nitrates and the phosphates: these are universally needed; and this is more particularly the case with our worn-out lands. Every intelligent observer, in examining these worn-out lands, will see at once that they are almost entirely destitute of vegetable matter, which is indispensable for the formation of nitrogenous matter. Most of these worn-out lands in this region of country have a good mineral basis, and they contain generally ample supplies of all the other mineral elements,—such as lime, potash, soda, magnesia, &c.,—and they only need the restoration of organic matter to make them as productive as ever. These lands are all well adapted to the growth of clover, and this furnishes the best and most efficient means of re-supplying them with organic matter. Nitrogen is the main and universal want of these worn-out lands, and the clover crop furnishes it abundantly. Clover belongs to that class of plants called leguminous, which are alone capable of assimilating to any extent the free nitrogen of the atmosphere. It draws all of its nitrogen from the atmosphere, whilst it finds all of the mineral elements needed in the clay. This is proven by the fact frequently seen here, of the clover plant growing luxuriantly on embankments of pure red clay, and on lands in which not a particle of vegetable mould may be seen. Clover draws little or no

nitrogen from the soil, whilst it gives a great deal to it. This is the case with all of the legumes. They take nitrogen abundantly from the atmosphere, and this is the reason why they are good improvers. The stems, leaves, and roots of the clover plant are all rich in nitrogen —a fact proven not only by analysis, but by a fact known to practical farmers, that all plants requiring large supplies of nitrogen—such as wheat and tobacco—flourish best on a clover lay. A heavy crop of clover will yield nearly 200 lbs. nitrogen,—being nearly three times as much as a maximum crop of wheat will require.

Dr. Volcker, the eminent chemist of the Royal Agricultural Society of England, says, that even after a crop of hay has been removed, the roots alone, when a heavy crop has been grown, will be fully equal to 800 lbs. of Peruvian guano. It will thus be seen how exceedingly valuable the clover crop is—a fact not fully realized by the great mass of our farmers, otherwise they would pay more attention to growing it.

The wheat crop requires a great deal of nitrogen, and heavy crops of wheat cannot be grown without ample supplies of it. The highest authorities in agricultural science, as well as the experience of the most successful wheat-growers, prove this. Mr. Lawes, of Rothamstead; M. Ville, of France, and Prof. Johnson, of Yale College, all attach the greatest importance to nitrogen as the most important constituent in all fertilizers intended for the wheat crop.

Mr. Lawes says: "Good crops of wheat cannot be grown unless there is a liberal available supply of mineral constituents within reach of the plant; and further, *that such supply is ineffective unless ammonia or nitrogen, in some other available form, be liberally provided in the soil.*"

The mineral elements alone will not produce wheat. No matter how abundantly they may be supplied to the soil, they are in a great measure inert and ineffective without a due admixture of nitrogen, in the shape of some of its compounds. Mr. Lawes established the fact fully and beyond the shadow of a doubt by his 20 years' experiment in wheat-growing. On one plot the mineral elements alone were applied regularly each year. The average *increased* product from this plot was only 8 bushels per year. On another plot the mineral elements combined with ammonia salts were regularly applied. The average *increased* product from this plot was 20 bushels per year.

The idea that good crops of wheat can be grown by the use of lime, or a super-phosphate, without nitrogen, is a preposterous one. It is true that on a very rich soil, or one heavily manured with stable or farm pen-manure, these elements may be applied with decided advantage, and they may increase the product very considerably, but upon a poor medium soil such an application would add little or nothing to the product. Nitrogen must be found primarily in the soil, or it must be supplied artificially, in order to produce wheat.

The mineral elements needed for fertilizers are comparatively cheap and abundant, and most of these fertilizers contain ample supplies of them. Indeed, our soils supply them all abundantly, except lime, potash and phosphoric acid, and some times one or more of them. But it matters not how abundantly they are supplied to the soil, they are in the main worthless without the addition of nitrogen, in some of its compounds.

Every bushel of wheat contains from 1½ to 2 pounds of nitrogen, and in order to make a bushel of increased crop from 2 to 4 pounds must be supplied artificially. Mr. Lawes says, that in his 20 years' experiment it took 5 pounds on an average for every bushel of increased product. Other authority, however, put the quantity lower than that. Prof. Johnson, of Yale College, estimates that a crop of 33 bushels per acre would require 56 pounds of nitrogen; but he does not state whether this is for an increased crop, or that it includes what the soil would naturally furnish.

Nearly all of the fertilizers now prepared for the wheat crop are *fatally* deficient in ammonia. Many of them do not carry more than from 1½ to 2½ per cent. of ammonia, and an application of 200 pounds—the usual quantity applied per acre—would furnish only from 3 to 5 pounds—about enough to increase the yield from 1 to 2 bushels. The cost of such an application would be from $4 to $5, whilst the value of the crop would be increased only $2 or $3.

It will thus be seen from these estimates, which are obtained from the highest authority, and sustained by the observation and experience of the most successful wheat-growers, how utterly ruinous it is to use the low-grade fertilizers on the wheat crop. The impoverished farms of Virginia have already lost millions by using them, and inevitable ruin awaits them if they do not stop it.

WM. HOLMAN.

Cartersville, Cumberland Co., Va.

Errors in Fertilizer Analyses.

Editors American Farmer:

An assertion is frequently made by farmers that they get equally as good results from the application of low-grade phosphates to their lands, such as they prepare for their own use, from various purchased formulæ, which, in some sections, are in general use; these formulæ generally require but a very small quantity of ground bone and sulphuric acid for the production of soluble phosphate of lime, capable of producing, under the most favorable circumstances, not more than two per cent. of soluble phosphoric acid in combination with lime, while the large bulk is composed of muck or other vegetable offal from the farm, mixed with a little plaster and salt.

And the question is frequently asked me why it is so; gentlemen making the assertion are well-informed and intelligent in their avocation, close practical observers, which gives more than ordinary weight to their assertions. An extensive experience in analyzing and examining various fertilizers and their constituents, gives me the key to the solution. It is this: too many of them are overrated in their chemical value. The difficulty lies with the chemist, and not wholly exempting some manufacturers, who will not lay to one side an analysis of their material, notwithstanding it may seem doubtful to their reason that they get such extravagant results in comparison with former experiences. With commercial astuteness they soon classify their chemical advisers into the high and low analysts; the

former are employed for selling their products, while to the latter the honor is accorded for being very clever in their profession when a purchase is to be made. This system of classification by any branch of the community is radically wrong, and if persisted in must be detrimental to continued and ultimate success, and must necessarily, in an economic point of view, determine the farmer to prepare his own fertilizer, if of a low grade, in preference to the manipulated one of uncertain composition.

I regret to say that almost daily some difference in analytical determinations is brought to my notice, which more and more impresses my mind that a much higher order of scientific intellect and more skillful manipulation is required to complete a fertilizer analysis than is accorded by many chemists and manufacturers.

A fertile source of error is in the application of the volumetric methods in determining both the quantity of phosphoric acid and ammonia: not that these methods are not absolutely correct when performed by skillful and accurate analysts, but many physical conditions must be held constantly in view to secure accuracy: the first is correction for the expansion and contraction of both the glass measure and the test fluid, above and below the normal temperature; the next is the atmospheric pressure upon the surface of the liquid. It is obvious that if a volume of liquid is measured at the ordinary summer temperature, the bulk will not be so great in winter; that in summer will have a less value than that of winter measurement. Few take into consideration these varied conditions of matter, and add or subtract the proper co-efficient for expansion or contraction. The result must necessarily be inaccurate: at one time in favor of the manufacturer; at the other against him. All matter has a regular co-efficient for expansion for each degree of increased temperature.

This is easily demonstrated by filling a gallon measure with boiling water and allowing it to cool; the difference in quantity is readily ascertained. Now taking into consideration that ammoniacal matter is purchased at about the rate of $3 unity or percentage per ton—then the error of one per cent., in quantities as supplied to manufacturers and farmers, must aggregate in the loss of thousands and thousands of dollars to the farmers, and I can assure your readers that this is common. In many instances I have been called upon to correct analyses in ammonia determinations, ranging from two to four per ct. during the last year. You will readily observe that in the first instance $6 per ton had to be refunded to the manufacturer, who purchased on an overrated and inaccurate analysis, while when no agreement was made in the latter case the loss was $12 per ton.

The discrepancy in phosphate, both soluble and insoluble, is still more alarming; in the latter I have frequently seen it amount to from 10 to 15 per cent.

Another serious loss to the farmer is the extravagant quantities of *precipitated* or *reverted* phosphoric acid found in the manipulated articles. After a series of exhaustive investigations I have not found more than two per cent. in the average soluble phosphates, excepting those containing large percentages of ferric oxide (sesquioxide of iron) with which the phosphoric acid is in combination. In that case as soon as the fertilizer is thrown into bulk, or placed under circumstances to lose water of hydration, it passes into compounds as insoluble as in the original before the treatment with sulphuric acid had been resorted to. To make this presentable for commercial valuation, after the soluble phosphate has been washed out with cold water, the residue is subjected to such extraordinary manipulation as boiling with citrate of magnesia or ammonia to force a result that does not exist; the consequence is, when placed in nature's great laboratory, where art is powerless, satisfactory results are not obtained. This mode of analysis is forced to such an extent that it is not infrequent that the original insoluble phosphate has been attacked, showing a larger percentage of precipitated phosphate than could possibly exist,—taking into consideration the quantity of sulphuric acid that was added for producing the solubility. Upon a little reflection it is obvious the same result obtained in laboratory investigations that Baron Liebig pointed out years ago, as taking place in the soil when Peruvian guano was applied, viz: The phosphate of lime was made available on account of the presence of its saline constituents, notwithstanding there was sufficient free or carbonate of ammonia present, to keep all the phosphate of lime insoluble for ordinary laboratory experiments.

The conclusions I have arrived at in regard to the presence of *precipitated phosphate* in the ordinary soluble phosphates prepared from bone ash, ground Charleston rock, or raw bone, is from loss of basic water, or the water that takes the place of and enters into combination with the phosphoric acid, where the lime has been removed by sulphuric acid.

This is caused in two cases: 1st—when the super-phosphate is being prepared rapidly and in large quantities; if the sulphuric acid has not been sufficiently diluted with water, when thrown into bulk, the chemical reaction is still going on: that is, removing two parts of the three of lime from the bone phosphate. Sufficient heat is generated to drive from this delicate combination the water requisite for forming the soluble compound. The second is where nitrogenized matter added to the above mixture of phosphate and sulphuric acid, decomposition (rotting) takes place; ammonia is formed, which precipitates the soluble phosphate of lime precisely the same as in the course of analysis, where to the filtered watery solution water of ammonia is added.

It would be of great benefit to the farmers and those interested in agriculture, who, from their pursuits in life, have but little opportunity of studying the value of these important compounds, if, gentlemen, you would obtain from the bureau of agriculture the analysis of the important crude material, particularly the phosphatic bases, giving the quantity of phosphate of iron and lime they contain, and by keeping constantly in view they would become in time familiar with the matter they use for cultivating their crops: they could then in a measure know whether the chemist was correct in his analysis, and not force the ferric phosphates into extravagant value as far as the precipitate phosphate determinations go.

That the composition of *crude* material should from time to time be given to the public is obvious from the publication in your February number from the *Scientific Farmer*, wherein, speaking of rectified Peruvian guano, that is after it has been treated with sulphuric acid to render the phosphate of lime soluble, that it should contain 10 per cent. of ammonia. There are always two sides to every statement, and by a reasonable line of argument doubts can be thrown upon the accuracy of the one or the other.

It is within the experience of many chemists of ability and integrity that we get but a small fraction of Peruvian guano in its crude state containing more than 10 per cent. of ammonia; how then after, it has been diluted with a large quantity of sulphuric acid, can it still retain its original 10 per cent. of ammonia, if it did contain it at the commencement of dilution?

There is no chemical question at issue to determine this—only one of the simplest problems of arithmetic—if diluted with equal weight of sulphuric acid it can only contain 5 per cent. of ammonia.

The importance of chemical analyses in determining the value of material is obvious. To be of value, they must be done accurately, divested of all semblance of a commercial character. Why not have them of as great a degree of accuracy as if a scientific investigation is being made; it is certainly of as great importance. I have pointed out where, when a comparative slight difference in percentage is given through ignorance, cupidity, or carelessness, thousands of dollars are lost in agricultural products.

Respectfully, etc., P. B. WILSON.
Laboratory of Washington University,
Medical Department.

Progress of Agriculture in Georgia.

We have received from the Commissioner of Agriculture of Georgia, a copy of a "Report on Chemical Analyses and Commercial Values and Prices, with a Formula for Composting Fertilizers at Home, and Reports of Experiments with Commercial Fertilizers in 1875." We find in the numerous experiments presented in this Report some very strange results, which may be accounted for by the fact that the season of the growth of the last year's crops of cotton and corn, with which these experiments were connected, was an unusual one; the drought for a long period being very extreme, and subsequently the rains being in excess of the usual amount of fall at the latter end of the growing season.

By the Report it would appear that there were about sixty different brands of fertilizers used in Georgia during the past year, a tabular statement of which is given, with the names of the articles, the analyses to determine the amount of the moisture; the phosphoric acid, including soluble, precipitated or reduced, and insoluble of each; the ammonia and the potash. To these are added the commercial value, the cash price, and also the time price per ton; where sold at the price named; for whom analyzed, and where manufactured.

These tables present the whole subject of fertilizers to the farmers and planters of the State, and are furnished in pursuance of the laws enacted by its Legislature, to protect the farmers from imposition, and the Commissioner (Dr. Thos. P. Janes) congratulates the agricultural community upon the development of the improved quality of many of the brands over those of the previous year, and which improvement is accompanied with the decrease in the price—the annual publication of these tables having engendered a lively competition, by the direct contrast of the analyses and prices of the various brands offered for sale in the State.

In some of the experiments reported, it is frequently shown that some of the plots of ground where the fertilizers were sown produced a *loss*, in comparison with the adjoining plot where nothing was applied,—and in other cases the stable or compost manure of the farm showed a decided advantage over the commercial fertilizers used alongside of it. In other cases the fertilizers paid well.

We annex an account of one experiment, of Simeon Smith, of DeKalb, extending through the years 1874-5, for the purpose of showing the effects of fertilizers on the crop of the second year, viz:

The soil was an old field taken into cultivation in 1874: thin, gray, sandy land, never fertilized till 1874.

In 1874, No. 1 was not fertilized; Nos. 2, 3, 4 and 5 were fertilized with 360 lbs. per acre, of Ragsdale and Upton. In 1875 the same rows were planted, Nos. 2 and 5 being again fertilized, at the rate of 200 lbs. per acre, and Nos. 1, 3 and 4 planted without fertilizers.

1874.	Seed Cotton, per acre.
No. 1, no manure, produced lbs	211
No. 2, Ragsdale, " "	1,013
No. 3, " " "	1,013
No. 4, Upton, " "	1,028
No. 5, " "	1,028

1875.	Seed Cotton, per acre.
No. 1, no guano, produced lbs	90
No. 2, Ragsdale, " "	1,119
No. 3, not manured this year, produced lbs	665
No. 4, " " " " "	726
No. 5, Upton, produced lbs	1,164

Another experiment by Reuben Jones, of Baker county, we give for the purpose of showing the result on a crop by the use of the offal of the cane mill:

Soil, common lime and light sandy pine land, comparatively fresh and fully second-class pine land. Bedded in three-feet rows. 1st April the fertilizers were distributed at the rate of 200 lbs. per acre in the water furrow, and the beds reversed. The cotton was planted in the usual

way, the ground at the time being dry. The cultivation was surface culture with sweeps and hoe,—and the season was favorable to 3d day of May, from which date to the 7th of August, there were only three very light showers. Mr. Jones says he has been planting for thirty years, and never before witnessed such a drouth. About one-fourth of the cotton died on the fertilized plants—none on that without manure. That on which the compost was used was seriously injured by boll worm. 200 lbs. were used to each of the plots, except the first and seventh.

Results.

		per acre.	Yield in seed cotton, per acre.
Plat No. 1.	Compost of equal parts of Cotton seed and woods earth, applied at the rate of 40 bushels per acre....	...	840
Plat No. 2.	Coe's Amm'd Bone Sup. Phos....	200	960
" No. 3.	Watson & Clark's Sup. Ph. Lime.	200	720
" No. 4.	Patapsco (from Department).....	200	868
" No. 5.	Chesapeake (from Department)..	200	868
" No. 6.	Genuine Phos. Pho. Peruvian (Ober's AA—from Department)..	200	880
" No. 7.	No Fertilizer.....	...	948

Mr. Jones also experimented with bagasse, or backings from cane mill, as a fertilizer for sweet potatoes, at the request of the Commissioner, with the following very interesting results:

Land bedded with two-horse Brinley plow, November, 1874; the bagasse distributed in the water furrow, as fast as crushed, and beds reversed immediately with the same plow. April 1st, 1875, the beds were renewed or flushed, and the slips planted as usual. Result:

Where the bagasse was used, bushels per acre..... 250
Where the bagasse was not used, bushels per acre.. 125

The second plat was on the same character of land, and received the same culture. The land cultivated in potatoes, experienced the same drouth as that in cotton.

We cannot give more of the experiments, but annex the following

Formulæ for Composting.

If the stable manure and cotton seed have been preserved under shelter, and the compost is to be used on red oak and hickory lands, use the following:

No. 1.

Stable manure	750 pounds.
Cotton seed (green).....	750 "
Acid phosphate or dissolved bone.....	500 "
Making a ton of.....	2,000 pounds.

Directions for Composting.—Spread under shelter a layer of stable manure four inches thick; on this sprinkle a portion of the phosphate; next spread a layer of cotton seed three inches thick; *wet these thoroughly with water* and sprinkle with phosphate; next spread another layer of stable manure *three* inches thick. Continue to repeat these layers in the above order until the material is consumed. Cover the whole mass with stable manure or scrapings from the lot one or two inches thick. Allow the heap to stand in this condition until a thorough fermentation takes place, which will require from three to six weeks, according to circumstances, dependent upon moisture and the strength of the materials used. When the cotton seed are thoroughly killed, with a sharp hoe or mattock cut down vertically through the layers; pulverize and shovel into a heap, where the fermentation will be renewed and the compost be still further improved. It is now ready for use.

FOR COTTON.

Apply in the opening furrow 200 pounds per acre, and with the planting of the seed 75 or 100 pounds per acre,—making in all 275 or 300 pounds per acre. If it is desired to apply a larger quantity per acre, open furrows the desired distance and over them sow broadcast 400 pounds per acre; bed the land, and then apply 100 pounds per acre with the seed.

FOR CORN.

Apply in the hill by the side of the seed, half-pint to the hill. An additional application around the corn before the first plowing, will largely increase the yield of grain.

For sandy pine lands, dissolve sixty pounds of muriate of potash in warm water and sprinkle a proportionate quantity of the solution on each layer of stable manure and cotton seed. The same weight of cotton seed and manure, or 60 pounds of the two, may be omitted when the potash is used.

If lot manure, or that which has been so exposed as to lose some of its fertilizing properties, use—

No. 2.

Lot manure.....	650 pounds.
Cotton seed.....	650 "
Acid phosphate.....	600 "
Sulphate of ammonia.....	60 "
Muriate of potash.....	40 "
Making a ton of.....	2,000 pounds.

Mix as in No. 1, except that the sulphate of ammonia and muriate of potash must be dissolved in warm water, and a proportionate part of each sprinkled on each layer of manure and cotton seed.

No. 3.

To utilize the Marine Tertiary Marl, found in Macon county and those adjoining, use—

Marl.....	600 pounds.
Muck, or rich vegetable mould.....	600 "
Acid phosphate.....	500 "
Agricultural salt.....	200 "
Muriate of potash.....	100 "
Making a ton of.....	2,000 pounds.

Mix thoroughly the ingredients and allow them to stand a few weeks; apply from 300 to 400 pounds per acre, to cotton or corn in the drill.

This marl may also be profitably used, either naturally or burned, in combination with salt, at the rate of 10 of the marl to 1 of salt, and applied broadcast over pea vines or other green vegetable matter, and all turned into the ground with a good turning plow.

Neither marl nor lime should be applied to land deficient in vegetable matter.

Directions for the use of these composts have been given only for corn and cotton—the two crops to which fertilizers are principally applied in Georgia. Experience, however, has shown them to be equally efficacious when applied to other crops, either field or garden.

From 300 to 400 pounds to the acre on small grain have produced perfectly satisfactory results.

By reference to the foregoing tables of analyses, etc., it will be seen that acid phosphate or

dissolved bone of high grade can be purchased at from *thirty to thirty-five dollars per ton*, so that the actual outlay need not exceed $7.50 per ton of the compost when 500 pounds of phosphate are used, as in formula No. 1.

In making these composts the proportions of stable manure and cotton seed may be varied to suit the supply at command, though care must be taken, if the cotton seed are largely in excess, to avoid excessive heat and consequent cooking of the seed. When killed, the seed should be soft enough to be readily mashed between the fingers.

In the above formulæ, the potash may be omitted on lands comparatively fresh and on which the original growth was oak and hickory; but if such lands have been much worn, it will be well to retain it. The presence of oak and hickory, or other potash-consuming growth, is an indication of the presence of potash in the soil. When such lands, however, have been so worn than when turned out, stunted old-field pines spring up, it is safe to assume that the addition of a moderate quantity of potash will increase production.

The economy and profit of the compost system is no longer a debatable question with practical farmers. However much the pseudo-scientist, who rejects facts which his theories fail to explain, may endeavor to turn it to ridicule as "unscientific," with the true economist and practical agriculturist, the solid facts derived from the crucial test of nature's laboratory will outweigh all his theories and the shallow sophistry by which he seeks to sustain them.

The true scientist, however, does not shut his eyes to facts, but uses them as material of which to build his theories.

It is earnestly hoped that the farmers throughout the State will avail themselves of the advantages of the compost system this year, to the full extent of the home manures that have been properly husbanded, and prepare to save, under shelter, all available excrementitious deposits from all kinds of stock, for the compost heaps of the next season.

A due regard to the economy in this respect will be worth millions of dollars annually to the farmers of the State, in money saved and in increased production.

Corn Growing on Scientific Principles.

In the *Scientific Farmer*, now published at Boston, Dr. E. L. Sturdevant, one of its editors, gives the following account of the way in which he intends to grow his corn crop this year:

The fields to be in corn this year on Waushakum Farm are these: The first will be the same eight acres which were planted with corn in 1875, and whose history introduced this series of writings. [Copied into the *American Farmer* of December last.] If corn can be profitably grown, year after year, on the same land by the use of chemicals, it is a matter well worthy of experimental practice. Field No. 2 is at present in sod. It has been engaged, probably for the last twenty years, in growing apple wood. This crop was removed at one operation last fall, leaving us quite a large field whose history may be briefly stated as follows: No manuring for ten years to our knowledge; our neighbors say certainly not for fifteen. Crops harvested, the apple wood as aforesaid, and perhaps half a ton of hay per acre in the best seasons, and less when the seasons were less favorable. Field No. 3, a continuation of field No. 2, and with nearly a similar history, barring the apple-tree growth, but plowed last fall, and now receiving a very light dressing of cow-dung. Field No. 4, we at present intend as purely experimental. It is as good land, perhaps, and as rich as any on the farm, unless it is a portion of one field which was in corn last year.

The general character of our land is a sandy or gravelly loam, without any appearance of clay. It is underlaid at varying depths with gravel, and in the gravel are usually found strata of iron pan, from a fraction of an inch to occasionally a foot or more in thickness. Between the gravel and the loam, a sandy, yellow sub-soil. The roots of the grass usually extend to the gravel, but not very noticeable in the area adjacent to the gravel. The surface of our land is rather level, but occasional depressions contain deeper soil than the summits of the undulations, and now and then the surrounding muck lands extend their bays or coves into the uplands. This description is rather general, and is intended to convey an idea of the situation of our tillage land, without having a definite application to any *one* of these fields to be under culture. It is thus seen that the land can hardly be considered favorable for the grasses, and that it is liable to suffer from drought.

Upon this land, of the general character described, we shall commence operations in the spring, as soon as the season will permit. Our first procedure will be to sow, by means of a broadcast machine, the super-phosphate in the quantity desired *upon the sod*. We shall then invert the sod with a swivel plow, not plowing deeper than we can help—but probably about five inches. We are neither advocates of shallow plowing nor deep plowing. Which is the preferable course is, in our mind, determined by the character of the land. In our case we have thoroughly tried deeper plowing, and are not satisfied of any corresponding benefit resulting therefrom *to us*. We feel sure that this shallow plowing, for us, is in no way inferior to the deep. One strong reason for the adoption of shallow plowing this year, will be readily perceived by those of our readers who have carefully read the preceding papers, when taken in connection with the distribution of the super-phosphate on the sod. Theory indicates that to derive the most advantage from our phosphoric acid, it must be applied at a depth from the surface—*in the location where we desire the roots to grow*. It is visionary to expect that we can apply a mere sifting of super-phosphate on the pulverized surface of a field, and then *mix* it with the soil with the harrow. We may by a harrow put some of it deep, and some shallow; but its proportionate bulk to that of the soil stirred by the implement is too insignificant for us to hope for any real evenness of mixture. In plowing it under, however, we are sure that the inverted sod contains the applied manure on its

under surface, and *all* of the super-phosphate is at a designated depth. Plowing is the only practicable way of obtaining the theoretical result that we desire; and if we hope to obtain 80 or 100 bushels of corn grain to the acre, we must be very careful to have all the conditions for theoretical success, that we can foresee, in our favor.

Let me recall attention to the fact which is shown most strongly by all experimental science, viz:—that phosphoric acid, the valuable constituent of a pure super-phosphate, is diffused by the water of the soil and the rainfall, over but a comparatively limited extent. Perhaps we may safely say, that in ordinary soils, the phosphoric acid, if not taken up by the plant, will be found at the end of the season within one or two inches of the place where it was first applied—certainly within a very few inches, for, practically speaking, it never leaches. It is probable also, that its specific function, apart from its food value, is to increase the fibrous roots of the plant. Hence, theory points markedly to the course indicated in this paper, to apply this element at a depth sufficient to prevent the roots from occupying a surface soil very certain to be dried by the summer sun; and if so dried, the phosphoric acid is not in a condition of solubility so as to be absorbed by the plant, and consequently cannot benefit the plant. It is also necessary to bear in mind that we desire the corn root to be developed in its strength, near enough to the surface to obtain the benefit of the warmth of the upper soil. We, considering these various points, have concluded that about 4 or 5 inches is a fair mean, from which the best results may be anticipated. The reasonings herein are an interpretation of the science which experiments have furnished us, and we trust that the correctness of our assumptions may be shown later in the year—at harvest—in the results.

Fertilizers for Tobacco.

An inquirer of the *Southern Cultivator* having asked what is the best manure for tobacco, the editor answers as follows:

The *Courier-Journal* is gathering the experience of tobacco men in regard to the best fertilizer for this staple product. One writer gives as his opinion, after years of patient experiment, that aside from stable manure, he has found that ashes are the very best, and the next best is a mixture of one-third saltpetre to two-thirds gypsum, well mixed, and applied at the rate of three hundred pounds to the acre.

Mr. Wm. S. Keine, of Kentucky, gives the following as the result of his experience, excepting stable manure:

The articles most needed in the soil for tobacco are, first, potash; second, lime; third, phosphoric acid; fourth, ammonia. Any land that has been in cultivation for a length of time becomes exhausted first of phosphate, then of potash and ammonia; so these are the most essential things needed in a good manure for tobacco.

A good article of ammoniated super-phosphate, mixed with potash, soda and magnesia salts in the proper proportions, is the best manure for tobacco; or a mixture of 100 pounds dissolved bone, which is true super-phosphate, 100 pounds wood ashes, 100 pounds dry hen and pigeon manure and 50 pounds land plaster thoroughly mixed. Either of these can be used, sown broadcast over the whole field, from 300 to 400 pounds per acre, or if used in the hill, a small handfull scattered around the plants after they are set out. In place of the dissolved bone, bone dust may be used in the same proportion with the other articles. This is good, but not so quick as the dissolved bone. Or 100 pounds bone dust, 100 pounds wood ashes and 50 pounds land plaster, well mixed and used on land that has been in clover the year before, will not need ammonia, as the clover that was left in the soil will supply that. Bone dust alone will be found good, but for tobacco potash in some form should be mixed with the bone. When bone alone is used it should be harrowed in, as it becomes fit for the plant much quicker when covered in the soil.

Caring for the Manure Heap.

There are few subjects more urgently requiring the earnest attention of the farmer than that of making and preserving his manure heap. It has been demonstrated, and we have shown it time and again, that the manure in the barn-yard properly preserved under cover, is worth really twice as much as that which is left exposed to the elements,—the richest of its constituents being washed away before its application to the crop. As remarked by a cotemporary, "the greatest mistake that a farmer can make is to allow his manure to remain exposed to the air and water, under the eaves of his barn, instead of being securely placed under cover, and then kept from the action of the weather. A covering over the manure heap is easy to build, and any farmer can do it. The amount of money to be paid out for material will not amount to much, and will be many times returned in the increased worth of the manure. Once more, brother farmers, if tempted to leave things in the old way, don't do it; spruce up, and don't allow the sun, air, and water, to take what the land of your farms so much need to make them productive. Western farmers may afford to lose manure, but we cannot."

On the Use of Concentrated Fertilizers.

Whilst recommending the use of fertilizers broadcast for corn and other grains, as preferable to putting it in the hill, for the reason that the roots will be stretching out beyond the place of deposit for the fertilizer in search of food, as well as because of the danger of damage to the germinating powers of the seed by being brought into contact with the powerful dose of the fertilizer, the New England *Farmer* gives the following as its experience in the use of hen manure and other powerful fertilizers in the hill:

Hen manure, unmixed with foreign substances, is, if well preserved, one of the richest fer-

tilizing agents produced upon the farm, and some method should be adopted for saving all that accumulates in the poultry house, and also for keeping it in such a way that none of its valuable properties shall be lost previous to its application to the soil. If allowed to accumulate in large quantities during warm weather, its own moisture will aid decomposition, and if left in piles under the roost, a large portion of the ammonia, which gives it its great value, will be set free and lost in the atmosphere. To prevent this waste, dry soil should be added to the pile often enough and in sufficient quantities to prevent decomposition,—for decomposition, as we all know, cannot go on without the presence of a sufficient amount of moisture.

In saving hen manure, it will be found advisable to use dry soil very liberally as an absorbent of moisture, and this soil, as it becomes dampened by contact with the fresh droppings, will, in its turn, also tend to retain the ammonia from the manure as it is set free, and hold it for the use of plants. There is little danger of using too much dry loam under the roosts, the only objection to using more than enough being the extra labor of handling it.

The exact amount of loam that should be mixed with a bushel of hen manure, to make a compost that shall be perfectly safe for using in the hill, will depend partly upon what is meant by a bushel of hen manure. If it has already been largely mixed with loam, as it should be while being gathered, less will be required at the time of composting than if the manure is absolutely pure excrement. Again, the manner of applying it in the hill should influence, in a measure, the method of composting it. If the compost is to be thrown in a heap directly under where the seed is to be planted, it will require much more loam for composting than if it is spread over a considerable space and mingled with the soil of the field.

Most of us have yet much to learn of the best methods of applying concentrated fertilizers to the soil. With scarcely an exception, every one who experiments with highly concentrated fertilizers for the first time, not only loses much of the value of the fertilizer, but also the crop it was designed to benefit. As in the case of gunpowder, nitro-glycerine, or kerosene oil, it seems as though we must all get up at least one explosion before we can fully realize the immense amount of power there is condensed in these harmless looking substances.

We well remember how a strip of corn looked in a certain field upon which we made our first experiment with guano, some twenty years ago. According to the directions which came with the bag, one spoonful of the guano was to be put in each hill, to be covered with soil before dropping the corn. The directions were followed to the letter, but the corn never came up, and there was a strip through that field all summer with no corn, but plenty of beans, the latter having been planted later, after the burning of the guano had nearly ceased.

Two years ago we tried a barrel of Brighton fertilizer in the corn-field and garden, using it in the old way, a spoonful in the hill, covered by soil. Nearly half the seeds planted failed to germinate, nor did we wonder at it, when, after a few days, we found the spoonful of fertilizer increased nearly one-half in bulk, and a fetid mass of corruption. Would any one expect corn to germinate immediately over a quarter of a pound of decaying meat? What farmer's boy of ordinary observation has not noticed that no grass grows very near to the body of a dead woodchuck exposed upon the surface of the ground in warm weather? Dead woodchucks make excellent fertilizers, but the decaying matter must be mingled with a large amount of soil, or the plants coming in contact with it will be burned up by the heat given off during the process of decomposition. Decomposition and combustion are one and the same process.

Rapid decomposition gives off sensible heat. Strong horse-manure, applied in considerable quantity, will not only fertilize a garden soil by giving it the elements necessary for plant food, but it will also stimulate plant growth by increasing the temperature of the soil. It gives the plants a "bottom heat," as gardeners express it; that is, it warms the soil and gives the roots of the plants comfortable standing room. But, if too much hot horse-manure is turned under and left by itself, unmixed with the soil, it may produce heat enough to burn every living root in it.

On the Cultivation of Tobacco.

Tobacco is one of the most profitable—as it is one of the largest—of the crops of this and the middle Southern States, and is cultivated to a greater or less extent in many other of the States of the Union. As it is particularly important to impart information upon the subject in the region through which the *American Farmer* most largely circulates, we avail ourselves of the opportunity afforded by the reception of a pamphlet received from the "Shelton Tobacco-Curing Company," of Asheville, N. C., to publish the following paper upon the cultivating and curing of tobacco, contained therein, which is claimed to be "the best practical and most reliable information possible," and in fact to be, what its title claims, "The Planters' Guide." It purports to be the result of the experience of some of the most successful tobacco-planters, and instead of one man's ideas on this subject, it is the combined experience of many.

The pamphlet contains also a description of a "Patent Hanger," invented by Mr. Shelton, and of course is issued more particularly for the purpose of presenting its claims to the consideration of the public, as an improvement upon the plans for curing the weed most generally adopted; and it is but proper for us to say, that the inventor—Mr. S. C. Shelton—is claimed as a very successful tobacco-grower in Western North Carolina, and his "Hanger" is believed to be "destined to supply a long-felt want which none were better aware of, or better prepared to

meet them, than the inventor: he having had 25 years' experience in cultivating, curing, and manufacturing tobacco," and has received first premium awards for exhibiting the best leaf tobacco at Raleigh, N. C., in 1874; at Richmond, Va., in 1872, and at the Vienna Exposition, in 1872. With this brief introduction, we annex such portions of the pamphlet as are applicable for the season:

CULTIVATION OF TOBACCO.—The cultivation of tobacco in the United States has become so extensive as to embrace at least forty-two States and Territories, which produce an annual crop of about three hundred million pounds, with a value to the producers of at least forty million dollars.

Therefore it is a matter of great importance to the planter, how to cultivate and prepare it for market in the best manner, and at the least possible expense.

After making careful observations, we believe that tobacco, with skillful culture and management, is the most remunerative of any crop grown, and a poor business if grown and handled without the application of those principles and appliances which extensive experience has proved to be the best adapted to the end desired.

VARIETIES OF TOBACCO.—Loudon enumerates fourteen different species of tobacco, of which only one, the *Nicotiana Tabaceum*, is generally cultivated. Of this species there are many varieties, each possessing qualities supposed to be derived from climate, soil, and modes of cultivation.

Few, if any, plants are so much affected by the peculiarities of the soil on which it is grown, by circumstances of fertilization and mode of curing, as tobacco. For example, the Broad Leaf Orinoco, when cultivated on the rich and highly manured lands of Kentucky, produces the dark, strong-flavored "shipping tobacco;" and when grown on the light gray soil of Virginia or North Carolina, with but little or no manure, and cured in a close barn with artificial heat, will produce the bright "wrappers" for which these States are so famous.

The variety known as Connecticut Seed Leaf is grown principally in Massachusetts, Connecticut, New York, Pennsylvania and Ohio, and is used in the manufacture of cigars, both for fillers and wrappers. Florida, portions of Ohio, Pennsylvania and other States, produce the Cuba, which is also used in the manufacture of cigars. Maryland, Virginia, North Carolina, Kentucky, Tennessee, Missouri and other States, cultivate many varieties, prominent among which are the Big and Little Orinoco (or Broad and Narrow Leaf Orinoco,) Big and Little Frederick, Blue and Yellow Pryor, Big Stem, White Stem, Gooch, and numerous other kinds that bear different names in different localities; and though mostly hybrids, they each possess some good qualities which recommend them to the growers.

SEED.—Whatever the variety cultivated, it is very important that you have good seed for sowing. In order to secure this hereafter, a few of the earliest and most promising plants should be selected from the seed-bed, transplanted in some favorable spot, and carefully attended throughout the season. In time these should be pruned of all except the large leaves, and only the two topmost branches left to bloom. These plants should be carefully suckered, and about the first of October, every pod not thoroughly ripe, plucked off and thrown away, and the others gathered and put in a dry place to cure. When dry, the seed should be rubbed out, sifted, and placed in a dry vessel, and kept where no dampness can reach them. Seed preserved in this manner will keep for years. By giving a little extra attention to your seed-plants, you can increase the yield and improve the quality of your tobacco.

SELECTION AND PREPARATION OF PLANT-BEDS.—In selecting a place for plant-beds, remember that you wish to obtain *early* and *vigorous* plants; therefore, take a rich, warm hillside, protected by timber or otherwise. Red lands are usually unsuited for this purpose. Never use wet or cold land. After finding a suitable place, select a dry time during the month of December or January,—the sooner the better,—rake off the leaves, lay down skids (about three inches in diameter,) three feet apart, across which lay a bed of wood five or six feet wide, and high enough to burn for about an hour and a half and yet leave a sufficient quantity to remove and kindle in another place.

After the fire has burned the length of time specified, move it the width of the first layer, then throw on brush, a good bed of wood, and continue as before. Every farmer ought to provide himself with iron hooks for pulling plant-bed fires. If it is possible to injure land by hard burning, we have never experienced it; and think that where one bed is injured by burning, ten are injured for the want of it. For every ten thousand plants required, there ought to be at least ten yards square of plant-bed. A bed of this size will supply more than the number mentioned, but it is much better to have some for your neighbor than to be under the necessity of begging plants.

After burning, the land should remain untouched a few weeks, that the rains and frosts may assist in pulverizing the soil; then with a mattock, dig up the bed without turning it over, and pulverize thoroughly with a hoe and rake. Remove all the roots, spread a light coating of stable manure, chop it in, rake again, and the bed is ready for sowing. A large tablespoonful of seed to the ten yards square is enough to sow. This should be carefully mixed with sifted ashes, about half of it sown one way, and the other half by walking across the first sowing. By this the seed will be more regularly distributed. After seeding, the land should be rolled or trodden until it is smooth. Now is the time to manure. We consider horse manure collected under cover (and free from litter or grass seed) to be the best for this purpose. Chop it fine, and spread a coating (say half an inch or more) evenly over the bed. This should be the last manuring unless the spring is very dry, when a light top-dressing occasionally will be beneficial.

As to the use of guano on plant-beds, we are not prepared to recommend it as highly as stable manure. We will add, that in the ab-

sence of this manure, a light dressing of plaster will be of service; but if you have good stable manure, "let well enough alone;" for if these directions as to land and management are followed, there is about as much chance to fail in plants as to fail of going to sleep at night after a hard day's work burning land.

About three weeks after sowing, the bed should again be rolled or trodden, and covered with fine brush twigs to prevent its drying up, and protect it from the frost. The brush should not be removed until the plants are large enough to nearly cover the ground.

There are few circumstances under which a plant-bed in the right locality, well burnt and manured, should be watered. We are disposed to think that watering is useless unless the spring is very dry.

PREPARATION OF NEW LAND.—First take up every growth not too large to grub, and throw them into heaps. Then cut the small trees, the brush of which throw on the grub heaps; then cut and remove the larger timber. After the ground has been cleaned off it should be coultered at least three times; then harrow and rake it to pulverize the soil and remove the roots. It should now be laid off at a distance of three feet each way and hilled. The hilling is very important, as a plow in new land will not prepare it right, and "whatever is worth doing is worth doing well." The manuring of new land, though troublesome, pays well.

We would recommend it to be applied in the hill if the land is rough, as broadcast will waste much of it the first year. Thin ridge land will produce a beautiful crop with a tablespoonful of guano to the hill. The second year it may be manured as other land; for if the first year's work is well done, it will be prepared to receive manure broadcast. New land should be hilled at least three weeks before transplanting, and while the land is moist, so that the soil will become compact enough to retain moisture, that the plant may thrive without rain after being set out.

PREPARATION OF OLD LAND.—A gray, gravelly soil, with manure, will make a fine article of tobacco if the manure is properly applied.

On common corn land the application of two hundred pounds of Peruvian guano per acre (or other equally good fertilizer) applied broadcast, will insure a fine crop; but if the present crop is the object, it may be made with one-half this quantity applied in the hill.

We have succeeded well by the application of guano in drills. After the land has been thoroughly plowed, lay it off in rows three feet apart, and in these strew the fertilizer. Plow on each side of the rows (turning the furrows in) to cover the manure and form continuous beds, which should afterwards be nicely hilled. We think *all* upland should be hilled. About one hundred and twenty pounds of guano is enough per acre when drilled. Land for raising shipping tobacco should be more heavily manured—say for an acre, six or eight cords of manure spread broadcast and plowed under; and in addition from two to four hundred pounds of some good fertilizer applied in drills. Ashes is a superior fertilizer for tobacco of any kind, on any soil.

In the Northern and Middle States, where the lands are high and the seasons short, the growers of tobacco resort to a system of high manuring, for the purpose of forcing the plants to mature and increasing their production. With them it is quite common to apply ten or twelve cords of stable manure, and in addition to this, from two to five hundred pounds of guano per acre.

TRANSPLANTING.—When the plants are four or five inches high in the beds they are ready to set out in the hills. As a rule we prefer a medium-sized plant, because the larger the plant the more moisture and sustenance it requires, and the small plant is safer, but not so far advanced as the medium or larger one.

After giving that part of the bed from which you wish to remove plants a thorough soaking with water, for the purpose of softening the soil to prevent the breaking off of the finer roots, remove the plants carefully and wash or shake off all the plant-bed soil, in order to give them a fresh free start in the new soil. Take great care of them, and do not place so many together that they will be crushed or bruised, nor keep them out of the ground until the tender roots dry up, but take them at once to the field and drop one on each hill, to be followed immediately by the planter, who should take hold of it near the roots with the thumb and forefinger of the left hand and with the right hand smooth down, or, in other words, straighten out the roots. Then, with a peg, about six inches long, make a hole in the centre of the hill large enough to admit the roots without their touching on the sides; also make it deep enough to take in the longest roots without bending them.

Put in the plant carefully as deep as the bud; then, with the peg and thumb of the left hand, press the soil firmly to the roots, and draw the earth around the plant so as to fill the entire hole. The best time to transfer the plants from the bed to the hills is when the soil is moist, but not so wet as to cause it to bake around the roots and kill them, or prevent their getting an early start. If the season is very dry, before setting out, take the dry earth from the tops of the hills, set the plants late in the day, giving them the benefit of the night dew, and before the dew has dried off in the morning, cover them with straw, brush, leaves, or anything suitable.

This covering should remain until rain falls or until the plants get a good start. This we consider the best plan that can be adopted under these circumstances. We do not approve of watering, because it has a tendency to make the soil bake, as mentioned above; but when it becomes necessary, from a continued drought, after watering the hill, cover the spot with dry earth, and it will tend to prevent baking.

REPLANTING.—This should be attended to as soon as you are satisfied the plant is weak or has failed, because you should have as little difference in the growth of your plants as possible. By exercising proper care in the first planting you will have but little replanting to do. We believe that cramped and crooked roots, air admitted to the roots by careless planting, and the bruising and crushing of plants by rough handling, are nearly, if not quite, all the causes of a poor "stand," providing the land has been properly

prepared and is in good condition at the time of planting.

CUT-WORMS.—Soon after setting out the plants, look sharp for long black or brown worms, which burrow in the hills and destroy the plants. Unearth and kill them every morning as long as they can be found. They seldom trouble new land to any great extent. The best time and method we know of for destroying them is to plow up the land during the winter and *freeze them.*

CULTIVATION OF NEW LAND.—The main secret is to keep it clean and well stirred. In new land this may be done by two good workings in the proper time, though a third working will often be very beneficial. If the land is freshly hilled, about two weeks after planting the hills should be scraped down and a little fresh earth drawn around each plant. About three weeks after this it should be hilled up, and in ordinary cases this will be sufficient, except to keep down the sprouts that may put up.—Tobacco ought not to be worked after topping, as it will bruise and break the leaves. Plowing smooth new land once (at the last working) is of service; but if it is rough and stumpy, keep a plow out of it altogether.

CULTIVATION OF OLD LAND.—Old land requires more work than new. As soon as the plants get sufficient hold, narrow up your cultivator, so as not to disturb the roots, and go through it once for the first hoeing. Then cut up the remaining grass and weeds with a hoe, and level the soil around the plants, stirring it slightly. In ten days or a fortnight go over it again with a plow or cultivator, twice in a row, using a short single-tree to avoid injuring the plants. This time you can stir the ground more freely around the plants, and should hill them slightly in hoeing, being careful not to cover any of the leaves. After this it is better to perform all the work with hand labor, in order to save the plants from injury. Stir the ground with a hoe as often as necessary to keep down the weeds.

WORMING.—If the worms are numerous, the plant should be thoroughly examined at least twice a week. Destroy not only the worms, but all the eggs that can be found; or, what is still better, seek out and destroy the flies which deposit these eggs. These flies are gray in color, with yellow spots on each side of the body, and may be found about sunset flitting about the weeds and flowers, extracting their juices by means of their peculiar tongue, which is four or five inches in length. The Jamestown weed, or "Jimson" weed, as it is commonly called, which bears a white, bell-shaped blossom, is very attractive to these flies. Many of them may be destroyed by dropping a little of the following mixture into these blossoms: *One ounce of cobalt, dissolved in one pint of water and sweetened with some kind of syrup.* But this is equally as fatal to the blossoms as to the flies; therefore we give you the following instructions for making an artificial substitute, which will prove to be more durable than the natural flower, and quite as effective. The ladies can best perform this work, as they happily possess more taste and skill in such matters.

Procure for the r use a quire of white paper and a bottle of mucilage. Then make a small block of suitable size and shape, on which to form the cone, and furnish them with a natural flower to imitate. If you have no blossom of the Jamestown weed, let them try their powers of imitating in making a "morning-glory." After forming the cone, clip it around the rim and curl slightly, to make it look as much like a flower as possible. Attach them to branches or bushes, and place them in your thickest growth of tobacco. They should be supplied with a few drops of the poison every evening, and it may be necessary to replace the flowers after a heavy rain. By following the above instructions you will save much trouble in worming. A flock of turkeys will also be found very useful in catching and destroying worms, and can only be equalled by children to whom premiums have been offered.

TOPPING.—This operation consists in taking off the top of the plant, and must be done for the purpose of concentrating the strength of the land in such number of leaves as will best mature.

It should be performed as soon as the seed-buds show themselves.

No rule can be given which will apply to all cases, as much depends off the variety grown, the condition of the soil, and whether your crop is well advanced or otherwise. With an early crop on rich soil, do not take off more than one or two of the top leaves, if any at all; while on the contrary, if your soil is poor and crop late, top down to that number of leaves which, according to your judgment, will fully ripen. The number of leaves to be left on the plant varies, in different sections and under different circumstances, from *eight* to *twenty.*

PRIMING.—This consists in removing the lower leaves of the plant to the height of five or six inches from the ground; these are removed for two reasons. First, if allowed to remain, they will be made worthless by coming in contact with the soil. Second, to improve the quality of the remaining leaves,—as in topping. Do not commence priming until the principal part of your topping is done; then continue it regularly, and save every leaf with as much care as if it were gold. Though light in weight, you will get some as fine tobacco from these primings as any in your crop, and it is simply folly to throw them away.

SUCKERING.—The suckers are small leaves that start from the base of the larger ones after the plant has been topped. They make their appearance at the top first, and should be continually nipped off as fast as they become large enough to get hold of; otherwise they will retard the growth and prevent early maturing of the plant.

REMARKS.—We have described the operations of worming, topping, priming and suckering, separately and in the regular order which they first appear; but they cannot be wholly performed and finally disposed of in the same manner.

Soon after you commence worming, the buds make their appearance and claim their share of your attention; then follows the priming and suckering. The first suckers will appear in about a week after topping, and will afterwards require plucking two or three times in the same number of weeks.

The worming must still be attended to. Thus it will be seen that two or more of these are continued operations and can be performed in connection with each other. To the experienced tobacco-grower, much that we have written in the way of explanation may seem altogether needless; but our intention is to embody, in this paper, all the practical information needed by new beginners, together with valuable hints to *all* tobacco-growers.

Manures for Grasses.

Perhaps those *very intelligent* farmers who are opposed to "book farming" may, by some means, before their death, become acquainted with the important facts contained in the following item upon the subject of manuring for grass; but it will probably be after they have lost the opportunity for years of benefitting from the information contained therein.

The Michigan Agricultural College has made careful experiments with different manures as top-dressings for grasses, with the following results:

The results of a single top-dressing on eight plots of nearly half an acre each of sandy, warm soil, exhibited the following facts at the end of three years: The top-dressing was applied in 1864, and the grass was cut twice each season in 1864 and 1866. The produce of each cutting and of each lot was weighed separately and a perfect record kept. The results for the four seasons were as follows: On the plot to which no manure or fertilizer was applied, the total weight of hay yield per acre was 8,740 pounds. Where two bushels of plaster per acre were applied the yield per acre was 13,226 pounds, a gain of 4,486 pounds. Where five bushels wood ashes were applied the yield per acre was 12,907 pounds, a gain of 4,167 pounds. Where three bushels of salt were sown per acre the yield was 12,867 pounds, a gain per acre of 4,127 pounds. Where twenty loads of muck per acre were laid on, the yield per acre was 13,816 pounds, a gain of 5,074 pounds. Where twenty loads of horse manure were laid on, the yield was 14,986 pounds, a gain of 6,226 pounds. These are results which indicate that there are fertilizers which will produce as good results as plaster. For instance the plaster yielded a gain of 51 per cent., while the horse manure gave an increase of 81 per cent., or nearly a ton more grass per acre in three years.

Management of Pastures.

From an essay read by A. W. Cheever, before the late meeting of the Vermont Dairymen's Association, we make the following extracts:

Pastures should be so managed as to yield the fullest possible annual returns, at the same time that their full vigor and productiveness are constantly maintained or increased. If a pasture is stocked with but one or two kinds of grass it cannot yield a constant and full supply of feed all through the summer. Grasses have a natural time for flowering, and when this season is past they make, comparatively, but little growth. Orchard grass, June grass, and perhaps a few others, are partial exceptions, as these make a continuous growth of leaves after the blooming season is over, if the soil is rich and is naturally adapted to these grasses.

To keep up a full supply of feed in pastures through the season, have as many varieties of grasses suitable for pastures as you can make grow. More feed can be produced on an acre from ten varieties than can possibly be from one variety, even if the ten all bloom at the same time, just as a wood lot will grow more wood and timber with several varieties growing together, than if wholly devoted to one kind.

Man is by no means the only social being on the earth. The trees, the grass, the birds, animals and insects are all better protected and provided for, as species, in company with each other, than if each species held possession of the world alone.

Some varieties of grasses do best on low, moist ground, while others thrive only on dry knolls. Some do best in the shade; others succeed only in the open sunlight. Some varieties incline to run up straight and tall, while others creep low and hug the ground. The coarse varieties, grown alone, would leave many vacant spaces, while the smaller and finer sorts would yield but half a crop; but, when many kinds are grown together, the land is made to yield all it is capable of producing. There is, however, a great deal of difference in the comparative value of different species of grass, both for pasture and for mowings, and farmers should be familiar with a great variety of the native and cultivated grasses.

When seeding down a pasture, one should sow all the varieties of grass he can obtain, and then watch the growth and habits of each kind to learn which to give the preference next time. But don't grow weeds as an experiment—they have been tried long enough already.

Overstocking pastures, as usually practiced, tends to run them out. The grass is gnawed down close, the hot sun burns and dries the soil, and the roots are either killed or seriously enfeebled. Overstocking and drought generally work together, as it is usually only during dry seasons that pastures are overstocked. In seasons of drought the grass ceases to grow, but the cattle don't cease to feed, and so the life of the grass is often sacrificed to save the lives of the animals.

But, however injurious the practice of overfeeding may be, it is hardly more so than the opposite of underfeeding. There may be cases where a pasture may be benefitted by letting it go unpastured for a season, but I do not believe it is often an economical method of treating it.

If land is to be pastured instead of having the crop gathered by the scythe or mower, it should be fed *as it grows*. It would not be profitable to mow a field every day, the harvest would be too small to pay for the labor, but cattle can gather the feed as it grows without much extra effort, while the grass will be in its very best condition. For the production of milk there has nothing yet been found superior to the short, sweet, recently-grown leaves of grass. If pastures are understocked, or if they are turned into too late

in the spring, the grass gets old and tough and is rejected by the cattle unless they are very hungry.

It should be our aim to get from our pastures all they are capable of producing, and we should also keep our cattle at pasture in the very best possible condition. These two things we must accomplish if we would obtain the best success with our pastures and our cattle. Now the idea I wish to specially impress is this: to so manage your pastures that they shall neither be over-fed nor under-fed. Grass remaining ungrazed is a dead loss, and may become more than that—a positive injury. A reasonable amount of grass should be left on in the fall, for a winter protection, especially where the ground is not usually covered by snow, but more than enough is either a waste or an injury.

Correspondence.

Draining Land.

Messrs. Editors American Farmer:

In my present article I purpose noticing the different kinds or modes of draining I deem of service to this section of the United States—There appears to me to be three different kinds of lands to be drained. First in extent and importance is the exhausted white-oak land; second, springy land; and lastly, flat, level bottom lands, from which in many instances it was difficult to find an outfall for the water. First in extent and importance, I believe, is the exhausted white-oak clays, much resembling the clay soils of Lincolnshire, old England; rolling, high, and from which the water has at all times run off the surface.—Such land I was born and raised on in the old country, and it has been, until about seventy or eighty years back, ploughed and cultivated, undoubtedly some hundreds of years without any other drainage but the furrow left by the plough betwixt land and land until much had become so unprofitable it was left to seed itself to grasses which were natural to that particular kind of land. About eighty years back my grandfather bought the property on which I was raised, all of which had been in natural grasses for many years, and so valueless was it considered, I have heard old men of the village say it was not worth having for the herding of sheep. My father commenced to underdrain it and otherwise improve it, but it was liable at first to the rot among the sheep—a fatal disease when it once takes hold of the sheep. The disease has ceased to trouble the Lincolnshire clay farms, in consequence of the improved state of farming from underdraining the land. Much of that land had not had a plough in it when I left the old country, and was worth, some of it, from 70 to 100 pounds sterling per acre, some of which I had ploughed, and the first crop harvested 14 quarters of black oats to the acre, weighing 36 pounds to the bushel; wheat would yield from 3½ to 6 quarters to the acre. Most of that land had been underdrained about 18, 20 to 24 inches deep; but a few acres—before I could remember—had been drained deeply, and showed most decidedly the advantage of deep over the shallower underdraining. It remained for a Mr. Josiah Parks to show the reason why deep draining will do all that is required to prepare the land to grow a crop, and shallow drains will not.

I feel reluctant to enter on the reasons why deep drains will drain effectually land, and shallow will not. Mr. L. A. Hansen in your February number appears to have about the same idea of water entering the drains as those who had been engaged in the shallow system of draining; but Mr. Mechi and Mr. Josiah Parks so successfully demonstrated and my experience since 1842, the winter of which I assisted and put in almost every tile on 5½ acres of land on the farm of the father of Mr. Cocking, of the Retreat, Port Tobacco, with whom, since I last wrote to you, I have conversed, and tells me that same land was in a perfect state of drainage, and he says he doubts not will be at the day of judgment if no violent convulsion of nature does not interfere to put it out of place. The piece of land seems to be the most complete for an example, as it had strong clay in one part and springy land in another. The clay part was put in 4 feet deep 20 yards wide in parallel lines; at that time we had not the long spade which came into general use and finally superseded the old tools used up to that time, without which spade I think scarcely any land in the United States can be made to produce sufficient to warrant the expense of deep drainage. Our men objected to the long spade much at first, but an American commencing draining would not have to contend with his men as we had; to get them to use it they would begin with it and gradually become expert at using it.

It will appear strange to the understanding of those who have not studied and experienced why deep drains are better than shallow, especially when, like Mr. L. A. Hansen, they talk of the water entering the top of the drain. It does no such a thing. The water enters the pipes from the underneath, or, as Mr. Cocking used to say, when arguing: "If a coating of cement was placed from end to end on the top of the tile, it would be all the better, as the soil could not get in between the upper joints of the tiles, but the water would enter on the underneath the tile, flowing to the tile in a sideway direction from the space between drain and drain." To illustrate: fill a barrel with soil 4 feet; then pour as much water in the barrel as will fill the soil to the top; bore a hole 2 feet below the top—the water will at first run quickly, then gradually slower until it has got to the level of the hole so bored.

THOS. CROFT.

Charles county, Md.

Old Times—Advanced Farming—Perseverance and Economy.

Editors American Farmer:

The tillers of the soil are a useful and necessary portion of the inhabitants of a country. Take them as a whole, they attend pretty much to rural matters. The Father of his country was a noble specimen of the farmer gentleman and patriot. It was only from a sense of duty and the call of his fellow-citizens that induced him to lay aside his agricultural pursuits. They are little given to castle building, but are aware that

they must look to mother earth for the wherewithal. They must not only apply their labor to that end, but must study out the modes of operation and devise the best means as well. They differ from those who seek to live off of the labor of others without adequate remuneration and affect to ridicule their simple manners and plain apparel. Speculation occupies but little of their thoughts; their attention is directed to their rural associations, their health and their crops. Whilst others bask in the sunshine of their easy acquisitions, in the heat of the day they recline under the shade of their own fig trees and vines, thankful to the Giver of all good

Being practical is one thing and a ready talker and writer is another. It need not be a prerequisite for an ordinary farmer to understand thoroughly chemistry, botany and mechanics, though he might be the better and wiser to know something of them. Fortunately for him some who are acquainted with those subjects are good enough to enlighten the readers of agricultural journals. It cannot be denied that there is a prejudice against scientific and progressive members of our profession, but I think that feeling is gradually subsiding.

Changes are continually going on as time advances. The early farmers of the country had to subdue the forests, move away or destroy the timber and clear off the ground for cultivation. When cleared they farmed it from year to year until it was completely exhausted. They resorted to the same methods until the forests were destroyed. The result was they had to enrich their lands by domestic fertilizers, or abandon them. Meantime clover and plaster were introduced, and for a while did wonders. Grazing was supplemented to utilize the provender and convert it into manure. Those, together with draining and liming, still advanced the productiveness of the land. A better style of implements and improved machinery still assisted the farmer. In these days of advanced ideas, improved machinery and implements, phosphates and fertilizers, there is much to be thought of and done. Prices are down, distant lands in the west are accessable to the seaboard by means of railways. With all their great and growing cities and dense populations, yet they ship quantities of grain and live stock to the east.

Just now I know of no particular remedy, for hard times seem to prevail everywhere. The statesman and financier should put their heads together and devise ways and means to bring about a better state of things. Could confidence be restored and some of the money hoarded up in the coffers of the wealthy citizen be set in motion, a change for the better might ensue.

It won't do to be idle, however; we must go ahead and keep moving. What we do, let it be thoroughly done. Look to economy in our operations. Be expeditious in our movements, so as to have the benefit of the seasons by timely sowing, cultivation and readiness for market.

If we look into the preceding numbers of the *Farmer* we see that upwards of 40 bus. of wheat to the acre have been made, and from 20 to 30 bbls. of corn per acre. We have known men to become wealthy by farming and good management.—What has been done might be done again. We see that business is at a low ebb, and everybody economical. There are not many spendthrifts because of the cash system, whilst we see how much less we can do with, and yet be comfortable; might we not make up our minds to curtail extravagance in eating, drinking, wearing apparel and equipage? Let those who like and can afford it do as they choose. The foolish frog burst in his trial to be as big as the ox. Beware of extravagance.

"Ere you consult your fancy, consult your purse:
Spending money is an evil, going into debt is the devil."

Those that get along now will most likely flourish when times are better. C.

Jefferson Co., W. Va.

ITEM.—Praise, where it is deserved, may not be amiss. I think the ladies deserve much credit for their industry and economy. They make and exchange divers things for articles needed, which supersedes the necessity of calling on their husbands in every case. Finding out how much a certain lady made and economized, I made a proposition to become a partner, but have not yet met with a favorable response. I hope she will take the matter under advisement for our mutual benefit. Sometimes co-operative schemes prosper better than single and individual.

OUR FRENCH LETTER.

To the Editors of the American Farmer:

Temperature for Butter and Cheese.

M. Tisserand having visited the dairy districts in the vicinity of the Baltic, draws attention to the advantages to be gained by the conservation of milk, the preparation of butter, and the making of cheese, at lower temperatures than what are generally employed. France, and perhaps other countries as well, fails to enjoy all the advantages in butter-making that the farmers of Denmark and Sweden reap, by the adoption of a lower scale of temperature. In France it is believed, that in order to obtain good cream and good butter, the temperature ought to be maintained between 53 and 55 degrees Fahrenheit; below this, the cream it is alleged, will not mount. M. Tisserand has experimented on milk fresh from the cow, at temperatures varying from 41, 50, and 95 degrees, pending 24 and 36 hours, and found that the cream rose most rapidly as the temperature approached most to 32 degrees; that the volume of cream obtained was greater; the yield of butter superior, and the quality of cheese and butter peculiarly fine. There is nothing suprising in all this; it is only natural that cold should act on milk as it does on beer, wine, and such fermentable liquids, by conserving and ameliorating them, by preventing those changes due to the action of the agents of fermentation. The excellence of Vienna beer is owing to its being fabricated at a very low temperature. In the North of Europe, milk is kept at a temperature very low, by means of ice, and the ice is preserved in trenches for summer use. Thus, there is not a little economy in dispensing with fuel and its apparatus for heating. Milk cooled down to 37 or 39 degrees, by means of a running stream of spring water, will, according to M. Tisserand's experiments, yield ten per cent. more butter than when

maintained at a temperature of 57 degrees. M. Dahl, of Norway, obtains 17 ounces of butter from 12 quarts of milk, churned at 37 to 39 degrees, while 13 quarts were required to produce the same quantity of butter when the temperature was maintained at 64 degrees. It is owing to this peculiar method of preparation, that Denmark is enabled to export butter to China and Japan. One drop of milk contains 45,000 globules, of various dimensions, the largest being fewest in number; these globules, consisting of fatty matter, resemble a sky clustered with stars, and only occupy 7 or 8 per cent. of the volume in which they move; being lighter than the serum in which they float, they mount to the surface, the largest globules first, and form cream. In Denmark, the milk is placed in block-tin vases, twenty inches deep, and sixteen in diameter; these are placed in a reservoir, where water is constantly running, and to which ice can be added.

The Fat Stock Show

just held in the Palace of Industry, under governmental auspices, marks a notable progress over that of last year, both in general entries and the symmetry of the animals. The first cattle show in France dates from the year 1844. The display of sheep was above all remarkably excellent. This year also, bulls, rams, and boars, were admitted for the first time, and although no prizes were awarded, the classification by a tried jury must tell, by drawing the attention of breeders to those points recognized as superior: embodying thus sound advice for all whom it may concern. There were some excellent specimens of the white Charolais and the red Breton, as well as of that splendid race both as to form and fineness of skin, the Charolais Nivernais. In rams, the Merino took the lead, and perhaps next, its crosses. The Shropshire-down, and the Dishly Merino, had very fine representatives, some weighing 260 lbs. and exhibited what is considered the ideal of form, absence of horns, short neck, and consequently chest well developed. The display of poultry was very beautiful, and a cock and five hens, belonging to the Crêve-cœur race, which obtained the *prix d'honneur*, looked superb in their jet black plumage and tuft. The dead poultry were monster masses of grease. In fat stock, a Charolais Durham ox, weighing 18 cwts. and aged 34 months, obtained the first prize; as did also a lot of three sheep aged 8 months and 15 days, weighing collectively 4¼ cwts.; in pigs, a Yorkshire-Berkshire-Normand animal, aged ten months, weighed 4¼ cwts.

The principal fat cattle show in France is that which has recently taken place at Nevers; it is in a way the standard for the country. What the breeders and rearers seek, is not an animal excessively fat, for such would be objectionable, but an increase in the salable meat, of good quality, tender and juicy, with the fat spotted as it were throughout the lean. In place, as formerly, of having only a yield of 50 per cent. of meat, as much as 65 and even 70 per cent. is now obtained; the skin, tallow, offal, &c., being thus reduced to 30 per cent. This will not diminish, however, the price of meat, because persons who formerly eat it but twice in the year, consume it at present every day. In the neighborhood of Nevers, the rent of pasture land has risen nearly five-fold in twelve years—what was fr. 12 per acre is now 60. The locality has a special race of stock, the *Nevernais*, which is the product of successive crossings of the white Charolais with white Durhams. There is a large business carried on in the fattening of cows, a proof that the prejudice against that kind of meat—never a rational one—is on the decline. As a general rule animals of a mean size, are preferred by French butchers; large races do not bring so high a price as average ones, and three sheep weighing 90 lbs. each, are more profitable than one of 220 lbs.

Transportation of Fresh Meat.

It is in April next, that the company formed to work the Tellier process of preservation of meat in a fresh state, will despatch its first specially fitted up ship to La Plata. The process is this: the germs of decomposition are killed by a temperature of 32 degrees, and live only between one varying from 42 to 48 degrees. Tellier, by means of methylic ether, has conserved meat perfectly fresh and savory, save a loss of 10 per cent. in weight, for 57 days; the ether maintaining the temperature at the freezing point and dry, by the aid of ingenious generating cold machinery. France consumes 4,000 tons of fresh meat daily, and the company expects to add thereto by 100 tons, so the competition cannot frighten farmers—for the present at least. The voyage from La Plata to France is expected to be made in at most 30 days; the animals will cost but fr. 70 at the port of shipping near which they will be slaughtered.

Clipping Horses.

M. Veterinary Surgeon Felizet recommends, that instead of clipping working horses in autumn, a good shining coat, free from skin dust, can be secured, by giving the horses, from the middle of September, either alone or mixed with their evening feed of oats, one-tenth of quart of bruised hemp seed, and the same quantity of buckwheat in its natural state.

Economy in Stock Feeding.

Very minute attention is being given to the economical feeding of stock; for their sustenance only, the food ought to be in proportion to the 1-66th of their weight. It must also be borne in mind, that the consumption is not so much in relation to the animal's weight, as to the capacity of its chest, and that two animals, each 600 lbs. in weight, will consume a little more than a single animal of 1,200 lbs. In the case of draught animals, their rations ought to be double for every twelve hours of work, taking hay as the type of nutrition. Of course a dietary wholly consisting of hay is not to be thought of, but grains substituted *pro rata*. In the case of growing animals, in addition to their sustenance ration, they will require 14 lbs. of forage to add one pound to their weight; for fattening, 10 lbs. of hay added to the ordinary feed, will produce one pound of meat, and a supplemental ration of one pound of food will yield an increase of one pint in the milk, provided the cow be of a good milking breed; if not, the augmented food will only fatten. A point not to be overlooked, is to have a trustworthy cowherd, who will

possess some clear ideas respecting the necessity of feeding animals at fixed hours, and duly measuring their rations; he ought to exclude all damaged food, or adopt the usual means for ameliorating it; never forcing an appetite.

Preservation of Green Fodder, &c.

M. Goffart, who is one of the apostles of the movement in favor of the preservation of green maize for winter and spring feeding, asserts that he has received thousands of letters from his countrymen and foreigners, testifying to their success, and craving for more information. A few items on this important topic. The giant maize, or Caragua, though the seed has never been imported from Nicaragua, is the variety to sow; it yields as much as 70 tons per acre. M. Goffart cuts his green maize into lengths of 4 inches, by steam and hand machines; he has suppressed the angles in the trenches, and since the ends of the pit are oblong, the maize suffers less deterioration; he has also employed portable doors, when the pits are opened to take out the forage; this plan better excludes the air. He pitted two tons of chopped green rye the 8th of last May, and opened the pits the following September, when the cattle eat the rye the same as the green maize then supplied to them. All green fodder can be similarly preserved, in an uncut, as well as in a chopped state.

Tellier's Potato Cultivation.

Much conversation has since a year taken place relative to the Tellier process for cultivating potatoes. The tubers were planted in August, and were ripe in January. The Agricultural Society deputed one of its members to test the experiment; he followed exactly the instructions of M. Tellier and with the tubers supplied by him, planting others in a like manner. The sample tubers vegetated, and the produce from six tubers, just taken up, was less than half a pint,—the potatoes not being much larger than hazel nuts. The other tubers planted did not vegetate at all.

As hay is scarce this year, farmers substitute cut straw, steeping it with some bran, for twelve hours, with ordinary cut roots. When potatoes are employed, such ought to be either cooked or fermented. F. C.

Paris, February 10th, 1876.

Advantages of Soiling.

Editors American Farmer:

I see by the papers that a modified vagrant stock bill has passed the legislature. It is more than I expected when I last wrote. I am afraid that a thorough bill will never be enacted until the scarcity of rail timber drives the farmers into it. In my last I gave a rough estimate of the actual money cost of fencing a farm, saying nothing about the advantage of farming without inside fences. There are farms of great natural fertility, where grazing and raising cattle is the principal business; or rough hilly tracts where cultivation is difficult, that may be pastured to advantage and profit. But the great majority of Virginia, Maryland and Pennsylvania farms in my opinion, would be far better if no hoof of cattle were ever allowed on them Soiling cattle and horses necessitates forethought and knowledge of the best green crops for the purpose and the quantity required. If heavily manured, the land can be made to produce two crops of forage each year. Those who have most experience in soiling, recommend rye, oats, clover and broadcast corn—the latter coming in about the 20th of June and lasting until frost. The land that has been in rye, oats and clover, can be sown in broadcast corn as late as July 20th, on rich land. The advantages of soiling are that the cattle become more docile; the manure is saved, and the grass not trod out or torn up as is done in grazing. The time required to cut and haul the forage is of course something more than merely to drive them to pasture, but this is more than balanced by the time required to keep fences in order and looking up an occasional stray cow. Soiling necessarily implies a good supply of water at the barn, a good open airy shed wide enough to drive a cart between the heads of the cattle when feeding. A supply of hay should also be on hand, for the occasional wet spells, or when it is not convenient to cut green forage. This latter should always be cut in the morning and left to wilt, which will make it lighter to handle and give more nutriment in less bulk. Any one who wishes to go into soiling, can get better information than my limited experience. I have only a small place of 60 acres all under one outside fence, and while most of the farms in my neighborhood are getting poorer, mine is getting richer and will bring 25 per cent. more to the acre than it did six years ago. S. N.

Harford Co., Md.

Agricultural Calendar.

Work for the Month—April.

We have reached that season when not only every day but every hour brings its duty, and that farmer who has not his work in hand and well forward, must, after the mild winter we have passed, owe his delinquency to himself rather than to his lack of opportunities.

Potatoes.—To succeed in making a good crop, the ground must be deeply plowed, well fertilized, light and mellow. The use of green manures is to be avoided. Composts thoroughly broken down, bone dust, plaster, ashes, and salt, are all well adapted to these tubers. Culture in hills is most convenient for working; but many prefer drills, believing larger yields are achieved. Keep the ground loose and free from weeds. Make the hills broad, and never allow the earth to become crusted over. It is a good plan before the vines appear above ground to run a light harrow over the field, thus breaking the crust and destroying the small weeds just starting into growth. It is an advantage to plant early; but there would be no temptation to do this at the expense of proper preparation.

Oats ought to be gotten in as early as possible, but some care should be given the preparation for the crop, which is one that does not always get, but always repays, good treatment. A correspondent of the *Lancaster Farmer* gives the following on the best way of putting in the crop:

The usual way of preparing the ground is to plow it; but the writer and many others have proven beyond doubt that more oats can be raised by stirring it with a cultivator, and with a great saving of work.

The successive freezings and thawings during the winter make the surface of the ground in much better condition for starting the young oats plants than the more compact soil under would be if turned up by the plow; besides, the ground does not have to be worked so early, and consequently has more time to dry, so that it does not become so cloddy as when plowed.

The objection usually made to cultivating in oats is, that the ground is harder to plow for the fall crop; but my experience with a clay soil is quite the reverse, even in dry summers. Most farmers plow shallow for oats, for the reason that more grain can be raised by doing so. If the plowing is done when the ground is very wet, as is usually the case, the soil in the bottom of the furrow must necessarily be packed down, both by the pressure of the plow and by the horse that walks in the furrow; then, if the ground is dry when it is plowed for wheat, it is almost impossible to get the plow to run deeper than it did in the spring, and if it does it will turn up cloddy; while, if the ground is cultivated in the spring, and then not until it is well dried, the plow will go as deep as desired in the fall, and the soil will pulverize nicely.

Another reason why cultivating is preferable to plowing is, that nearly all the weed seeds near the surface are germinated and destroyed by the cultivation of the corn during the previous summer, so that but few are left to grow among the oats. If the ground is ploughed, all the seeds that had collected on sod before it was ploughed for corn are turned to the surface, and having lain but one year, will grow. This difference was particularly noticeable last summer, when *ploughed* oats fields were unusually full of weeds.

Mangel Wurzels and Sugar Beets.—These roots should be grown in land that is rich, deeply worked, and mellow; that not naturally good ought to be made so by the application of thoroughly-rotted barn-yard manure and composts, bone dust or super-phosphate. The seed, about four pounds of which is sufficient for an acre, should be sown early. If soaked over night in water and rolled in plaster to dry it will germinate quicker. The best method of sowing is by a hand-drill, which will make the furrow, sow and cover the seed, and mark the next row. Our own experience of the Planet drill (advertised elsewhere in this number) has been highly satisfactory, and it is undoubtedly one of the best in use. The rows should be from two to two and a-half feet apart, and the plants should be thinned out to stand 9 to 10 inches in the rows for beets and 12 inches for mangels. Keep the land well stirred on the surface and work deep.

We repeat our injunction to all the readers of the *American Farmer*, to sow a few rods if no more in these valuable roots, if only as an experiment in their culture. A trial even on so limited a scale will, we are sure, lead to larger crops another season. Their use for feeding purposes is attended with such satisfactory results as to convince all who will try them of their health-preserving effects.

Carrots are probably the most nutritious roots grown, though the most costly to raise, from the time and labor required to keep them clear of weeds in their early stages of growth. For them a rich sandy loam is best adapted, and deep and thorough cultivation a necessity. Subsoiling, where it can be done, is useful and profitable. The seed is sown in drills, which should be from 16 to 20 inches wide, and the plants thinned to stand 6 inches apart. If the seeds before sowing are mixed with sand and well shaken they will be more easily separated. We have found an advantage in mixing radish seed with them, which start off quickly and show the rows before the carrots are up, thus allowing them to be worked early. The ground should be allowed to become warm before sowing the seed.

Parsnips.—These are much less cultivated on the farm than they should be. Near markets they are generally a profitable crop,—bringing fair prices for the table. For cows and hogs they are much esteemed. They need the same general treatment and prefer similar soils to carrots. They may stand 6 to 8 inches apart in rows 18 or 20 inches wide. Keep the ground well worked.

Corn Culture.—The corn crop, the stand-by of American farmers, deserves the best care in the preparation of the land, the selection of the seed, and the application of manures. A soil good by nature, or made so by man, well pulverized at first, and thoroughly worked, is necessary to the profitable growth of the crop. The more favorable its condition at the offset, the easier will be the after workings; and, as a rule, the more and the better the manure applied, the greater the profit in a comparison of the cost of raising small or large crops.

Corn is largely a potash plant, but demands also for its growth and maturation phosphoric acid, soda and lime, in considerable quantities. It therefore needs to have available mineral supplies in some abundance. Hence the use of the phosphatic manures, ashes, potash fertilizers, salt, &c., is generally attended with good results. Good stable and barn-yard manures is equally as serviceable, and ranker manures than are fitted to some crops will be appropriated and assimilated by this plant, which revels in the richest manures that can be applied.

Upon the soil, the seed and the preference of the grower, depend the mode of planting, the distance apart, whether in hills or drills; but heavier manuring is of course needed where close planting is practiced. For manuring in the hill, nothing is better than a mixture of 5 bushels of ashes, 1 each of salt and plaster, 1 of bone dust: a handful of this will give the plant a start at the offset.

Early-maturing and perfect ears ought to have been selected and preserved carefully for seed. To protect it against insects and vermin, soak in a solution of two pounds of saltpetre to a gallon of water for a bushel of corn. Another plan is to coat the grains thinly with tar. A pint of tar boiling will suffice for a peck of seed.

Upon the land and its condition the cultivation of the crop will depend. The first working can hardly be given too soon after the plants can be seen; the after cultivation will depend on the season. The use before, and in the early stages

of, the cultivation of the crop, the Thomas harrow largely aids in the thorough preparation of the ground, and lessens the labor of working it.

Our readers are referred to articles on this subject elsewhere in this and and in preceding issues.

Corn for Fodder.—Nothing is more useful than a small patch of this in midsummer when pastures fail. It has become indeed almost indispensable to dairy farmers, for their cows, and horses relish it equally as much. Sow in drills 2½ feet apart, cultivate two or three times and the work is done, if the land is even moderately rich. The stalks should stand about twelve to the foot, and about two bushels of seed will answer for an acre. It may be sown up to the first of August.

Plaster on Clover Fields.—If not done, a bushel or two should at once be sown to the acre.

Live Stock.

Poland-China and Essex Hogs.

Messrs. Editors American Farmer:

If you will allow me, I will answer through your valuable journal several letters of inquiry with regard to the breed of Poland-China hogs. The Poland-China is composed of four distinct breeds—the Poland hog, the big-spotted China, Irish Grazier, and the Byfield. I am asked, which is the larger breed of hogs: the Chester-white or Poland-China? I think the Poland-China the largest breed of hogs we have, though I am not posted as to the greatest weight either stock have weighed. I have a friend living in Kansas City, who told me he saw an old Poland-China sow that weighed 1,900 lbs. gross, and was not very fat. He was so much struck with her, that he bought two of her pigs, and sent them to my farm here in Virginia, at a considerable cost. I have given great attention to hogs, and have tried a good many breeds to satisfy myself which stock of hogs would pay the farmer best to raise. I have had the Chester-white, Jersey-red, and Essex, and have also tried the cross of these different breeds, but found none that gave entire satisfaction until I obtained the Poland-China. There is no hog having the size of the Poland-China which makes such nice meat for the table. The meat of the other large breeds of hogs, such as the Chester-white, I find of coarse texture, and not at all adapted to table use. I consider the Essex an excellent breed,—being very easy to fatten, and entirely free from the mange. The meat of the Essex is fine and nice; the only fault to be found with this breed is its want of size. If proper attention be given, and good breeds selected, the hog will pay the farmer as well if not better than any stock he can raise. If the hog-pen is judiciously managed from the time the hogs are put up to fatten until killed, the manure will almost pay for the corn they consume. Let a cart-load of leaves be thrown into the pen, and as soon as they are well rotted taken out, and another load thrown in; if this is continued until the hogs are slaughtered, we will have a heap of manure that will be worth much more to us than a great deal of the guano we buy, and pay our hard-earned money for.

Z. C. DANIEL.

Spottsylvania Co., Virginia.

The Management of Sheep.

A correspondent of the New York *Tribune* has the following on the feeding and care of sheep:

In choosing ewes to breed from, care should be taken to select those which are rugged and well formed. If too old they will be weak in the spring, therefore it is better to let them go barren and fatten them the coming year. Neither should they be too young, not less than two years old past, so that they may be three years old the spring their first lamb is dropped. I will give my rules for telling the age: A lamb has eight small teeth on the lower jaw, called the sucking teeth. When it comes one year old past the two centre ones come out, and two wide ones fill their places. Thus they change, two coming out yearly until they are four years old past, at which time they have a full set of these wide, short teeth, setting closely together. After this they grow long and narrow, and in time will loosen and fall out. Sheep will do well as long as these teeth remain firm, so they can feed in the summer. I have known the native or coarse sheep to live and do well until fifteen years of age. Select a ram with large, full chest, which indicates a good constitution. If the flock is small the ram may run at large with them for a short time morning and night. In no case should two rams be allowed in the same flock at the same time,—for if so, many ewes will not prove with lamb. Managed in this way one ram will suffice for from fifty to one hundred sheep, if properly fed. His food should consist of good early-cut hay, with a few oats, also potatoes, pumpkins, or other vegetables. Corn is too stimulating.

The ewes will usually drop their lambs three days less than five months from the time of their service. They should be kept in good condition throughout the year. Sheep, unlike other stock, require much fresh air. They should have a warm enclosure for cold, stormy weather, one that can be well ventilated when the weather permits, also plenty of outdoor exercise (with free access to water,) for it is well known that they invariably select the highest point of land in the pasture to pass the night; but in a storm a more sheltered place. Sheep in summer eat much browse and herbage; thus they are the best stock to eat up the poor hay, such as grows on low or new land. But this should in all cases be cut early. Some choice clover and timothy should be reserved for them just before and after lambing, to insure a good flow of milk. They should be required to eat up their hay close, but the refuse shaken out and fed to colts and horses, which will thrive well on it, even when taken from under their feet, the dust being all out. Sheep should have corn enough to keep their flesh up during the winter. In addition to this, raw potatoes and oats should be given them to start the flow of milk. As soon as the lamb is dropped, it and its mother

should be marked alike, so that they may readily be distinguished from the rest of the flock. See that the milk is started in the teat and that the lamb sucks as soon as it is strong enough. It is well to put them for a few days in a separate pen, and see that it sucks both teats. If the sheep should fail to have enough milk, steal, if possible, some from another sheep, rather than suckle them on a cow. But they should be fed on oats and potatoes until they have a supply. When about three days old, or strong enough, their tails should be cut off and the rams castrated. Lambs should be allowed an apartment by themselves, where they have access to wheat, fine feed or oats, with plenty of clover hay for them to pick. Sheep should be kept well enough so that the lambs look straight and handsome. Managed in this way sheep will retain nearly all their wool and shear a heavy fleece; but if allowed to get poor after lambing they will lose many of their lambs, also much of the wool from their legs and belly. Make a weak liquor of tobacco, put this in a tub and let two men take the lamb by its legs and head and dip it in, taking care that none gets into its eyes and mouth. Strip the liquor out of the wool as much as possible with your hand. This will effectually kill the ticks.

The Agricultural Horse.

A Western writer says we need a greater distinction in the classification of our horses; in other words, we want the roadster, the draft, and the agricultural horse. That we need the roadster horse all must admit, for light driving and saddle use. And it is equally as admissible that this is all the practical use we have for him. That there is a great amount of labor that can only be performed effectively with the heavy draft horse, is also a fixed fact. No one will contend that either can perform the labor of the other to any advantage. While these are facts that are not and cannot be disputed, it is equally as evident that there is a class of work that must be performed by the horse that cannot be done to any advantage with either the good roadster or the heavy draft horse. This is very suitably named, in the meeting referred to, the *agricultural horse*. This class is of more practical utility to the masses than all others combined; and in my judgment, instead of receiving the cold shoulder, should, if any partiality be shown, have the preference. This is the horse upon which all are dependent, and might fitly be compared to the laboring or producing class of men. The question often arises as to what constitutes the agricultural horse. It is a question easily answered, but a horse is hard to describe, owing chiefly to the difference of opinion as to what will fill the bill.

I would say that a horse for agricultural purposes should be selected solely for that purpose, without regard to light harness or heavy draft further than pertains to agriculture. That some farmers do use their farm horses for buggy and saddle, and all more or less for heavy draft, is true. The agricultural horse can be used in all these capacities in cases of emergency, but seldom profitably. Consequently most farmers keep a cheap, light team, to do light work. I shall not attempt to describe an agricultural horse in this article further than to say that about seventy of the eighty imported horses, and all of the grade Norman and Clydesdale, that were exhibited at our last State Fair, should come under that head, weighing, as they did, in high showing condition, from fourteen hundred to seventeen hundred pounds—but, reduced to working condition, would have weighed from twelve to sixteen hundred. That a large horse is most profitable for agricultural purposes is evident to every farmer. Successful farmers are scarce that would discard a horse weighing from fourteen hundred to sixteen hundred pounds and select instead one of the same formation and at the same price that would only weigh from eleven hundred to thirteen hundred pounds.

American Short-Horns for England.—Mr. Alexander, of Ky., the celebrated stock breeder, has sold to the Messrs. Fox, England, 24th Duke of Airdrie, and 20th Duchess of Airdrie. $30,000 for the two.

The Dairy.

Minutes of the Experimental Farm Club.

Editors American Farmer:

The meeting was called to order somewhat earlier than usual, when J. I. Carter read a short article on the profit of corn-raising in Chester Co., which led to some discussion on the use of fertilizers. Silvester Linvil and others spoke of good results from Acidulated South Carolina Rock. In answer to an inquiry, salt was commended as a relief against the attack of ants upon young corn.

The minutes were then read and approved, and the regular order of business suspended, that the club might listen to papers on dairy houses and ventilation, by Messrs. Reeder, of Bucks Co.; L. S. Hardin, of Kentucky, and Wilkinson, of Baltimore. Mr. Reeder's paper described the heretofore want of good dairy facilities in his section—that the spring-houses were liable to overflow, and were very irregular in temperature; that vaults were difficult to ventilate, and mostly too warm in summer. He had therefore been driven to invent a plan of cooling a dairy-room by connecting an ice-house with it. In this arrangement he had been very successful. By a system of ventilating tubes in the division walls, and an ice-chamber and ice-box, he was enabled to regulate the temperature, and control ventilation. He was opposed to deep-setting of milk, and cited several experiments, showing that all the butter could not be got out of the milk when so set. He also believed that it was important to ventilate milk. He then spoke of Mr. Wilkinson's plan for dairy-houses, and condemned it very strongly; said his houses were too expensive, were wasteful of ice, and that his sub-earth ducts would exert but little influence on the temperature of the dairy-house, and afford but imperfect ventilation. He had visited one of Wilkinson's dairy-houses, with a sub-earth duct 500 feet long and 11 feet deep leading into it, that affected the temperature only 26 degrees.

Mr. Reeder's address was listened to with marked attention. He was followed by Mr. L. S. Hardin, of Louisville, Kentucky. Mr. Hardin spoke of the difficulties he met when commencing to dairy in his location, and how he was driven to find better plans than those usually followed. After much experimenting he was led to adopt a modification of the old Swiss plan, of deep cans and sudden cooling. This had proved entirely successful. By this plan he could make more and better butter, more uniform in quality, with less care, less outlay for vessels, and greatly less for buildings. He gave the results of many experiments proving the truth of these statements. He forcibly called attention to the rapidity with which milk and cream absorbed all sorts of impurities, when spread out thin in shallow pans; how that the air was always more or less tainted with smells from our cow-yards, pig-pens, and surrounding decaying matters; that this air passed over our milk pans, leaving its taint and spoiling our butter; but that when pure, sound milk was put in deep covered pans, no such contamination was experienced; that freshly-drawn milk, put in covered cans and suddenly cooled, lost all animal or other offensive odors. He described his ice-box, in which his deep cans were placed, as a compact meat box 4 feet high, 2 feet wide, and a length to suit the size of dairy; a shelf near the top, held ice, which was put in once a day in summer, and a temperature of about 49 degrees maintained; his cans were 20 inches high and 8 inches in diameter. Mr. Hardin made a very favorable impression on the many intelligent dairy men present. On motion of Howard Preston, the club ordered a box and fixtures, for trial and experimental purposes, on the Experimental Farm. A unanimous vote of thanks was also tendered the speaker and Mr. Reeder. A lengthy article was then read from Prof. Wilkinson, of Baltimore, on the same general subject of dairy-houses. He expressed views quite different from both the previous speakers. His desideratum in a dairy-house was cool dry air, frequently changed; that this must come in contact with the milk, purifying it of animal and other odors, by æration; that the best way to secure cool, pure, dry air, was by use of his patent sub-earth ducts, and other ventilating arrangements. The Prof.'s essay was learned and interesting, but it would have been more satisfactory had he been present to further elucidate some points, and reply to strictures by other parties. Edward Conard and other members confirmed Mr. Hardin's opinion that cream would raise in deep cans very effectually, and the milk keep sweet and pure when tightly covered and set in very cool water. Mr. Lawson, of Oxford, then read a very practical and instructive article on bees. The essayist encouraged farmers to raise a few bees, as an additional source of revenue,—their attention would not require much time; but without some care they would not do much good. He states that bees should be domesticated as much as possible, by locating the apiary near walks and buildings; that very plain and simple hives were best, as affording fewer hiding places for moths—commended movable frames, with surplus-top honey boxes—that it was more profitable to keep bees making honey, than to raise swarms; that the life of a bee in summer was about four months, in winter somewhat longer, on account of the half dormant state of his existence during that season. The session having been fully occupied by the essays and speeches of visitors—the appointed essayists—and questions were held over until the next meeting. The following question was referred to Thos. J. Edge: Is a knowledge of agricultural chemistry any benefit or advantage to a farmer in conducting the business of his farm? JOHN I. CARTER, *Secretary.*

Chester Co., Pa., February 24, 1876.

The Cow and Her Management.

At the recent New York Dairymen's Convention, Prof. E. W. Stewart, of Buffalo, Lecturer at Cornell University upon agriculture, delivered an extemporaneous address, which, according to the *Utica Herald*, was received with much favor. It was a *resumé* of some points in his own experience as a practical farmer. Preliminarily, he replied to some questions asked in a discussion upon soiling, had upon a previous paper. The following is an abstract of his address:

The soiling of milch cows has been found by careful experiment to pay. I found that by soiling consecutively in oats, clover and sowed corn, that I had my crop of hay, raised upon land which would otherwise have been pastured, to sell, and after deducting all cost, I found a large saving by soiling. To show the difference in economy between soiling and pasturing, I measured off 40 rods of heavy clover, just coming into blossom. This kept 10 cows 15 days, equivalent to keeping one cow 150 days. I soiled thirty-five head of cattle from the 20th of May to the 8th of December, and found a surplus, on the same land that would have been required to pasture them, of 65 tons of hay, which brought $972—a sum equal to the value of all these cattle in the fall. An accurate account of the labor to soil these animals was found (when labor was cheap) to be only $75.

In answer to a question as to the health of the animals while soiled, he said he had soiled the same cows for a period of 12 years, and they were at the end of that time in perfect health. Cows require a certain amount of exercise; but that amount is not very large. In soiling it is important to feed the best kinds of food and in variety, and then there will be no complaint. Sound corn, alone, is not a complete food, and should not be used except in combination with other food. Dairymen should study how to mingle the proper constituents of food so as to make up a nutritious ration. Whey, for instance, contains the sugar of milk which will make fat, but not muscle, and if it be mixed with pea or oil meal, the mixture is nutritious and may be fed with profit. Straw, alone, is pretty poor food, but mingled with other foods it is beneficial.

He said the chairman had mentioned that high feeding had destroyed the milking qualities of the Short-horn, but this was a misconception of the fact. The milking qualities of the Short-horn had been bred out of certain families, by

selecting those animals that developed a habit of laying on fat. It is the mode of breeding more than the food. Some families of Short-horns had retained high milking qualities, because selections for breeding had been made with that purpose. Breeders are making a mistake in feeding cows so as to make "show animals." The experience of dairymen will go to show that by selection the best animals are obtained. When cows are properly fed they can be made to give milk in good quantity for 10 months. No cow should be kept that will not give milk ten months. A cow coming in milk in January, if properly fed, will give 1,000 pounds more milk than if she came in milk in May, because when turned to grass her milking capacity is increased. The question of profit is the principal question to be discussed. It is only the extra feed that gives any profit. You cannot starve a cow without loss, and no cow will yield her best unless full fed. As a question of profit, it pays to get all the milk the cow will give without injuring her. It is poor economy to store a cow without getting milk during a long winter. She is non-productive, and an expense. During the season when she goes dry she should also be well fed, so as to put her in good flesh when she comes in. This will give her a good stock of flesh to draw on during the coming milking season.

But he said he intended his main topic to be warm stables, which is a most important question to all dairymen. The cow is very sensitive to cold. Exposure to a chilling wind or storm will often cause a great shrinkage.

He strongly advocated the building of concrete basements for stables, on account of their durability and comfort. Any farmer who knows how to make mortar can construct them. It costs little more than the wooden wall, and it will last forever. The saving of food upon a dairy of 80 cows would pay for the building of a warm concrete stable in a single winter. The rotting of sills is also prevented by this method. Four shovelfuls of sand to one of lime will form the cement. Layers of mortar and stone (where stone is found) should alternate, not allowing the stone to come to the surface. This wall, being a poor conductor of heat or cold, is cooler in summer and warmer in winter than the wooden wall. The concrete will endure the fire better than the stone wall, and it costs, usually, only 10 cents per cubic foot. To prevent the moisture of the wall from rising or rotting the sill, a seasoned pine board, just the width of the thickness of the wall, should be laid on top of the wall, with the under sides smeared with coal tar. This will prevent the moisture from rising while the wall is drying.

It is false economy to build dark stables. All animals seek sunny spots, and they know what is good for them. A stable should always be well lighted; and it may be at a very slight additional expense. In order to save all the liquid as well as solid droppings, concrete bottom under the cows may be made at a small expense. Boards may be laid lengthwise of the stable on this concrete for the cows to stand upon. These boards will last until they wear out, and are easily replaced. In ten years it would cost more to replace rotten sills than it would to build a concrete wall. It is more convenient that the cow's head should be turned to the feeding floor. A basement may easily be put under a barn already built. The barn may be raised to the desired height, and blocked up level, then take 3x4 scantlings, set them perpendicularly under the centre of the sill, and build the concrete around them. It is an entirely air-tight wall which any farmer can build for himself, if he knows how to make mortar.

He spoke decidedly in favor of the octagon form of barn, as it admitted a self-supporting roof, of the strongest form conceivable. The interior purlin posts are dispensed with. Only two floor beams are necessary, for the purpose of sustaining a scaffold so as to fill the space over the floor. It requires much less lumber to build this sort of barn. Many of the beams are dispensed with. The roof is as expensive as that of any other barn. All the hay being put in one bay, it is not necessary to change the location of the horse fork during the season. There is much saving in labor. It is adapted to every farmer's wants, because it can be built any size desired, adapting itself to any sized farm, requiring only 35 feet timber for a barn 80 feet in diameter.

The practice of watering cows in the stable is more economical than any other. When watered at a common trough, the stronger drive away the weaker, and there is much contention. It is as important that the cows should drink without molestation as to eat undisturbed. In a region of good water supply, a V-shaped pine trough carried under the manger, will supply all necessary apparatus. The lid to the trough should be a part of the bottom of the manger, with India rubber hinges. The cows can thus drink with perfect freedom, and it costs but a trifle. Two troughs 80 feet long cost me but $25. We should do all we can to make the cow comfortable; give her the best food, where she can not be annoyed by another. The water should have an outlet at the end. The cow's manger should be kept as clean as our plates. This careful treatment of the cow will pay in the end.

Importation of Cattle.

The Treasury Department has modified its order prohibiting the importation of neat cattle and hides of neat cattle from Great Britain and Ireland, so as to allow the importation of blooded stock from said countries when accompanied by a certificate from a United States consular officer that such animals are at the date of exportation in a sound and healthy condition, and entirely free from the hoof and mouth disease, or any indications thereof.

A Sheep and Dog Law.

The Maryland House of Delegates has passed a bill to protect sheep husbandry, and it has reached, at this writing, its second reading in the Senate. It was introduced, as we believe, by Mr. Gwynne of Prince George's.

[Since the above was put in type, the Senate has indefinitely postponed the bill—which kills it, of course.]

Horticulture.

Maryland Horticultural Society.

The March meeting was held on the 16th, at Masonic Temple. President W. H. Perot in the chair; Wm. B. Sands, Secretary. After the proceedings of the previous meeting were read, the committee appointed to visit Annapolis to memorialize the Legislature to pass a law against vagrant stock, reported through Mr. R. W. L. Rasin, that the law so far had failed in the House, after having unanimously passed the Senate, and notwithstanding all honorable means had been used to convince the members that the city of Baltimore and its suburbs were as much in need of, and as much entitiled to, protection against the depredations of vagrant cattle, as towns like Catonsville and smaller villages which had received the protection of such laws; and the environs of our metropolitan city are entirely surrendered to the ravages of stock and subjected to an annual loss of thousands and thousands of dollars.

Petitions of our best and most progressive citizens had no effect upon the "legislators of our centennial term, who seemed to think it would be sacrilegious to interfere with the public pastures of 'one hundered years ago,' and who esteem the rights of cattle above the rights of men."

Mr. Rasin, on behalf of the committee, moved the thanks of the society be tendered Messrs. Stevens, of the Senate, and Whitelock, of the House, for their efforts to secure the passage of the law in the interest of rural improvement. Mr. Aug. Hoen, one of the committee, seconded the motion; and the thanks of the society voted voted to the gentlemen named for their active exertions in behalf of the bill.

[Since this meeting, the bill, materially changed in its provisions, has been passed by both branches—unanimously in the Senate, with only thr e votes in the House. It prohibits horses, cattle, swine and goats from going at large without attendants within *five* miles of Baltimore city; imposes fines]

The committee on awards reported the following prizes:

For best table designs, $5, J. E. Feast; second best, $3, Jas. Pentland; best basket cut flowers, $4, Gustav Berger; second best do., $2, R. W. L. Rasin; best collection of 12 plants in bloom, $5, John Feast; best 6 Azaleas, $3, E. Hoen; best 24 cut Pansies, $1, E. Whitman; best 6 Daisies in pots, $1, E. Hoen; best 12 named varieties cut Camellias, $3, Edw. Kurtz; best American seedling Camellia, shown for first time, $4, John Feast; special mention for a seedling Camellia, to Edw. Kurtz; best 6 Cinerarias in bloom, $2, John Donn, gardener to Mrs. Isabella Brown.

The display of plants and flowers was very large and handsome, and the attendance numerous, notwithstanding the disagreable weather.

Capt. Chas. H. Snow delivered his address on Orchids, giving many interesting facts connected with their history, habits, cultivation, &c., and exhibiting the plants growing on corks, on cocoanut husks, and some flowering without earth, and even without roots. Capt. Snow said a special house was not needed, and he gave instructions for their culture.

As varieties best suited for general culture he named the following: *Cattleya mossiæ, C. labiata, C. trianæ, Lælia anceps, L. purpurata, L. albida, Oncidium Cavendishii, O. sarcudes, O. aurosum, Lycaste Skinnerii, Tricophilia Sauvis. Dendrobium nobile, Calantha veratrifolia, Phajus grandifolius, Cyprepidium in var.*

His address was received with many manifestations of interest. For the April meeting the subject under discussion will be *Bedding Plants*, and Messrs. Henry Taylor and Andrew L. Black, were asked to open.

Potomac Fruit-Growers' Association.

March Meeting.

Messrs. Editors American Farmer:

On the sample tables were fine specimens of apples,—Smith's Cider, Rawles' Genet, and Winter Paradise (sweet.)

Prof. Taylor, the Microscopist of the Agricultural Bureau, made a brief address on Fungoid Diseases.

Drawing on the black-board a bundle of roots, (which in technical language is *Mycelium*,) he illustrated the various stages of fungoid growth, from a simple spore to its highest development.

The spores of blue-mould fungus, which are very minute, multiply so rapidly that millions of them are reproduced, under favorable conditions, in a short time. The germination of these spores forms Mycelium. This not only becomes a ferment but an acid producer. One form of the Mycelium is the "mother" of vinegar. Ropy bread and wine contain large quantities of Mycelium.

My investigations into the cause of potato blight have been of service in throwing light upon various forms of fruit blight, particularly pear blight; in this wise: woody fibre, paper, the cellular structure of plants, is *cellulose*; this in its woody form is not very digestible. The object of cultivation is to reduce the cellulose to its minimum, and so increase the starchy and albumoid matter of all fruits and vegetables, because these are valuab e as articles of diet. The pulp of highly cultivated potatoes, under a magnifier of 100 diameters, shows this cellulose. The little starch cells are so transparent and thin as scarcely to be observed; while the pulp of the potato, from the wild mountain region of New Mexico, shows this cellulose in thick and woody cells.

Let me illustrate: The hardy Irish laborer, who can brave the chilly storm, or endure excessive high temperature, with impunity, is really no more healthy than the refined lady who is raised in the parlors of modern civilization. The former is manilla paper, the latter the most delicate of tissues. Both are perfect specimens of their kind; but the power of endurance in the one is much greater than in the other.

The highly cultivated potato is most desirable as an article of food; but it is also most liable to decay under adverse circumstances.

The same is true in fruit-culture. Here also the cellulose is reduced to the thinnest possible

condition. The starchy, saccharine, and nitrogenous matter is increased, and consequently, under unfavorable circumstances, the cellulose is easily destroyed.

When a potato is frozen, the mass appears to decay, and sugar is produced; and the microscope shows that it is a portion of the cellulose and not the starch that is converted into grape sugar. This gives us an important basal fact for our theory of fruit blight; for, as the cell structure of the potato is dissolved by the action of frost, so is the delicate cellulose of other organized plants.

It is not therefore the bursting of the cell structure by the frost that produces the blight, but it is the chemical dissolution of the cellulose, and its conversion into grape sugar.

The delicate cell structure of buds, fruit, branches and trunks, of highly cultivated varieties, are easily converted by the frost into grape sugar, and when a portion of the tree or bark or fruit is so converted, that portion fosters the growth of fermenting fungi. But the rapidity of this growth depends upon the proportion of water present, the degree of temperature, the vigor of the plant, etc. After excessive rain, and at a temperature of 80°, a pear tree on my grounds succumbed to the blight, was shown by the fact that the leaves and bark were blackened. The blight was not altogether the result of the rains, but that was one of the favoring circumstances,—the last hair that broke the camel's back.

I close my remarks with some items of interest. Yeast is a mass of spores, and to have nice fresh bread every housewife knows that she must have fresh yeast. If "must" be heated to 100° and bottled, you will have an unfermented wine that will keep for a long time.

Starch, paper, rags, sawdust and every cellulose substance, may be converted into grape sugar. If common starch be treated with water containing two per cent. of sulphuric acid, under a moderately high temperature, the acid absorbs a portion of the chemical water of the starch, and the mass is converted into grape sugar. Hence our "golden syrup" and "silver drips."

Mr. Saunders found a pear tree on the grounds of his Department, which was wholly destroyed by blight, except about an inch of the bark near the ground. He caused the blighted bark to be scraped off, and the stump to be banked up with earth. The result was the green bark covered the entire stump again, and formed a healthy tree.

One way to prevent blight in trees is to wind the trunks with straw ropes, or wrap them with stout paper, or anything that will help the tree to retain its heat.

(The subject will be more fully developed at the future meetings reported.) G. F. N.

Washington, March, 1876.

The Management of Orchards.

[*An Address read by* JOHN I. CARTER, *at the Penn. Fruit-Growers' Society.*]

Mr. Carter has been good enough to furnish us with a copy of his essay, to which allusion was made in our March number, and we present it with much pleasure to our readers:

As this subject is rather too broad to allow the whole ground to be covered by one essay, I shall confine my remarks to a few practical hints embracing my own experience in the management of orchards.

I might preface, however, by stating my firm belief that judiciously selected and well-managed orchards will pay, and that farmers will find it profitable and greatly to their interest to give more attention to this department of their farms. It is common to say that if farmers grew much more fruit they would soon overstock the market, forgetting that as the supply increases and as their products are freely offered in the market the tastes of the people grow in that direction, and fruit becomes a necessity when before it was only a luxury. I remember, twenty or twenty-five years ago, when dwarf pears first became popular and an impetus was given to pear culture, it was confidently asserted that this branch would soon be overdone, and that pears would be a drug upon the market. Yet, notwithstanding the great increase in production, we had no difficulty in selling our pear crop this year at better prices than ever before. Hence, I think farmers need have no fear of a permanent glut of really good fruit, but might very safely make considerable *additions* to their orchards and give them *more careful attention*. One word more as to varieties to plant. I intend my remarks on this point, as well as on some others, to be more appropriate to farmers than to amateur fruit-growers or regular orchardists. Both of these classes would probably plant many varieties as specimens, as tests, and to keep up a complete succession; but for plain farmers, who want reliable, easily managed trees and marketable fruit, but few varieties are needed. Among the apples the Maiden's Blush, Smokehouse and Smith's Cider would be the three safest as stand-by's. Among the pears, the Bartlett, Seckel and Lawrence would occupy the same position; while the Governor Wood and Early Richmond cherries would generally be safe to rely on. These varieties do well almost anywhere in Eastern Pennsylvania, and the fruit is known and valued in the market. For my part I do not like any of the above-mentioned apples as eaters, but they *sell* and the trees are good bearers and hardy.

I do not mention peaches in this connection, because we can make no successful competition with this fruit with our Delaware and Maryland neighbors. In regard to the treatment of orchards, I believe it is with trees as with any other crop we raise, judicious manuring and good cultivation give the most paying results. Trees cannot grow too rapidly, provided it is a healthy growth, such as would result from a timely supply of all the needed ingredients and conditions wanted to make it such. And when bearing time comes there must be no cessation of food and care, as is too often the case.

I have always objected to Mr. Meehan's practice of non-cultivation, principally because it too often led farmers into a neglect of their orchards at the very time they needed most attention. In following his plan they too often stopped at the *grass* and neglected the *manure*.

To secure healthy trees and good crops of fruit not only requires the ground in good

mechanical condition, but a plentiful supply of available food of such variety as meets all the requirements of the trees. Experience has shown that in many localities we cannot grow a perfect crop of wheat with a purely nitrogenous manure. We can make, perhaps, a greater weight of straw, but not that bright, perfect stalk farmers like to see and bearing a head of well-developed grains. We must use *mineral* fertilizers, or in some way make those in the soil more available. So it is, I conceive, in growing perfect trees or making perfect fruit. We must insure them an abundant supply of mineral fertilizers. I think this was demonstrated in our orchards the past season. We had the most perfect fruit we ever had; indeed, the finest I ever saw. Some of our Bartletts weighed seventeen ounces each, and otherwise perfect. Our Seckels brought from $4 to $6 per bushel, and our apples were fine, though this was our off year. Our orchards have heretofore been rather unthrifty in growth and bearing, but latterly we have been giving them better cultivation, and using phosphoric fertilizers freely on the hoed crops between the trees.

Our treatment the last season was about as follows: We gave them the usual winter pruning, which was slight, merely cutting out injured limbs and water sprouts and those that interlocked, and cut back some of the most wayward and rampant branches, keeping the tree in reasonably good shape, with as little pruning as possible. We then washed or painted the trunks and larger branches with a composition of one-half bushel of muriate of potash, the same quantity of cow manure, five pounds sulphur, and one barrel of water. Previous to this and during the winter a light coat of yard manure had been applied. The ground was then carefully plowed, and planted with potatoes, giving them a good dressing of acidulated South Carolina rock. Immediately under each tree we sprinkled five pounds of muriate of potash. We find this muriate the cheapest form in which we can buy potash. It costs about 2½ cents per pound, and analyzes about 45 per cent. of potassium. As the ground contained pretty plenty of lime, we thought we had furnished the most needed materials for maturing wood and making healthy trees, and the result fulfilled our expectations. The trees held on their fruit, and retained their foliage late in the season. We suffered very little from blight or disease.

Of course we do not raise and sell crops on our Experimental Farm to the best pecuniary advantage, and our limited means prevent us from doing any of the many things undertaken very well; but we marketed this year about $130 worth of Governor Wood cherries, from twelve or fifteen trees; and over $400 worth of Bartlett pears from 150 bearing trees; and sold $100 of apples from an orchard of the usual farm size. Special attention to thinning fruit and marketing to the best advantage would have increased our receipts, and I only mention these figures to show what can be done in an orchard with but tolerable treatment.

La Revue Horticole has information that the introduction and growth of the *Eucalyptus globulus* in the miasmatic districts of Italy has been eminently successful in the objects desired.

A New Winter Apple.

A nursery firm in Richmond have had a colored plate made recently of a winter apple, which originated some years since in Nansemond county. The apple is as large as the Winesap, and of such a beautiful crimson as to draw from the agricultural club who christened it, the name "Nansemond Beauty." Quite recently, first week in March, the owner of the only original tree in bearing, sold his last barrel containing 40 dozen for $10 00, or 25 cents per dozen. I doubt if the quality of the fruit equals the Winesap, but its beauty and keeping qualities will always make it valuable, and besides it is a rapid grower and bears annually. NANSEMOND.

Profits of Forced Peaches.

We believe all attempts to make any very great profits from early peaches have failed in the vicinity of Philadelphia. We do not know why it has been abandoned. It would seem that it *ought* to pay. We give the following which we find as a "floating" paragraph, observing, however, that nothing of *profits* can be deduced from fancy prices, as competition soon pulls them down:

From a single tree planted in a tub, and kept in his hot-house, C. S. Holbrook, of Holbrook, Mass., has sold, in 18 years, no less than $2,300 worth of peaches—some of them at $36 per dozen; many at from $24 to $28 per dozen, and all at an average of $18 per dozen. They were sold mostly in the months of February and March.—*Gardener's Monthly.*

The Lady Grape.

The experience of Mr. Meehan, with this late introduction, is that it is a fine, healthy grower, and the fruit indicates it to be one of the best yet introduced.

Old Orchards.

M. B. Bateman, the well-known fruit-grower of Ohio, says there are in that State, according to assessors' returns, over 350,000 acres of apple orchards; and the average yield of fruit is but little over 30 bushels per acre, or not more than a full-grown healthy tree has often produced. Fully three-fourths of these orchards are from 40 to 70 years old, and as usual with old orchards they are only able to bear a crop every alternate year, and most of the fruit is deficient in size and quality; hence, in the fruitful years, the markets are glutted with second-rate fruit, and the price is so low as hardly to pay for marketing, and in the alternate years the orchardists have no fruit to sell; but the markets in the old-settled parts of the State have to be supplied from the thrifty orchards of the northwestern section, which is newly settled, and the orchards being young and on rich soil, bear uniform crops of good fruit. The old orchards are also more infested with the codling moth and other insect pests than the young ones, and this contributes largely to their unprofitableness. He says one hundred thousand acres of those orchards ought not to be allowed to cumber the ground and breed insects a single year longer! He would only leave a few of the healthiest trees to bear fruit for family

use until young orchards could be brought forward, and would cut away twenty thousand acres each year and plant as many young ones to supply their places.

That Wild-Goose Plum.

Editors American Farmer:

In the March number of the *Gardeners' Monthly and Horticulturist*, under the head of "Editorial Notes," the above-named excellent fruit has its reputation subjected to several bad "Quill stings," and in such a manner as is not altogether in keeping with justice.

It is pretty generally known and admitted, that there are many trees now in bearing that were grown from seed of the *true* Wild-goose plum; some of which have been propagated under name of "Wild-goose plum." Because of this *fact*, there are plums different in form and inferior in quality to the original or true Wild-goose, bearing its name as a passport to public favor. There may be a "mystery about" Mr. J. J. Thomas' "opinion" of this fruit. Mr. Meehan may also be "confused with this wild-goose chase," still I see no cause in all this for further mystifying the public and confounding the readers of the "Monthly." The unfavorable criticisms in the "Editorial notes," respecting this fruit, are not so surprising as the *fact buried* by them, viz: that concerning so old a fruit as the Wild-goose plum, the editor imparts to his readers no definite information, as to form, size, quality or anything else.

Very truly, &c., EASTERN SHOREMAN.
March 16th, 1876.

Floriculture, &c.—April, 1876.

By W. D. BRACKENRIDGE, Florist and Nurseryman, Govanstown, Baltimore county, Md.

Greenhouse.

We descanted pretty generally on this department last month, and much that we said then is applicable to the existing state of things now. At present, the principal work to be attended to is, first, to shift into larger pots all such plants as require it; and to remove into cold frames bedding-out plants, as Verbenas, Nierembergias, Petunias, Annual Phloxes, Scarlet Geraniums and Feverfews, &c, so as to secure space in which to grow other plants; for there is far more credit due to one who can grow a dozen of good specimens, than to another who can only produce a crowd of dwarfed sickly individuals.

Two of the most important items of management in the keeping in a healthy state a collection of plants in pots, is first, proper drainage, and next, the application of water at the root. We have often wished it were possible to prepare a table calculated to regulate amateurs in these matters, but alas! the conditions on which it might be founded are so numerous, and then the exceptions to these conditions under the management of ignorant practitioners, would be doubly so; therefore general directions are all that under the circumstances can be given, and the first one is, that when water is given that sufficient is applied so that it may find its way to the bottom of the pot; and secondly, never to give water when it is not needed; observing at the same time to keep the atmosphere humid by frequent syringings; and see to preserve an equability in the temperature of the house.

Lawn and Pleasure Grounds.

A pleasant excitement takes hold of Flora's votaries when the vernal suns and showers cause the Snowdrop, Crocus, Tulip and Hyacinth to pop their leaves through the earth, and develop their formal and varied-colored flowers. And who of us that does not cast their recollections back to the old homestead, where, at this season, patches of Narcissus—Daffodils of the butter and egg, or hoop-petticoat kind—sprung up among the budding Lilac bushes. In truth, all the Narcissus family are pretty—many of them not to be excelled in beauty by any of our hardy bulbous-rooted flowers; we venture to say this much in their favor, seeing that in these days of great revolutionary changes in the floricultural world, they run the risk of being supplanted by something not half so reliable. Of these we know 6 to 8 kinds that are perfectly hardy; and one other thing much in their favor is, that, where they grow near or on a lawn, that the leaves soon decay after the flowers are gone, and therefore do not stand in the way of summer flower adornments.

To these last, we will now turn our attention. We infer from what we have heretofore written, of having manure dug into the flower-beds in the fall, has in some cases been attended to, if not, this should be done as soon as the first spell of dry weather sets in; well-decayed cow manure is the best, or decomposed leaves that have been composted with wood ashes or bone dust, say one bushel of wood ashes or bone dust to a one-horse load of leaf mould; any of these applied, should be well incorporated with the ground when digging it; and if the soil is of clayey nature, an inch or two of sand will help it much.

It is too early during the present month, in this latitude, to plant out what we would call soft-wooded bedding plants, but a degree or so farther south it might do, for there is nothing gained by planting out such articles until such times as both the nights and the ground are warmed up; and in order to secure the greater success, a compost of light, rich earth should be prepared against the time of planting. And as a key in the grouping and arranging the colors and kinds of plants, we would refer our readers to page 148 of the *Farmer* for last year, which will be found a little deficient in some of the recently introduced kinds, yet will assist the amateur much in displaying his or her taste to greater advantage.

The advice which we heretofore have given in relation to the planting of Evergreens, we would here repeat, namely: not to permit the roots to get dried by the sun or winds, by heeling in the ground such as you cannot plant, until you are ready to do so. Make the holes to receive the trees broad, loosen the bottom up, put over this some good surface soil, on which place your tree, spreading the roots well out as the earth is filled in about until they are

covered; and if the ground is dry, give a good soaking of water, after which, finish the filling up; but do not tread, so long as the ground is wet. Young trees that have been frequently transplanted in the nursery, are preferable to larger ones that have been standing long in one place, as in taking up such, some of the larger roots must be cut, thereby giving them such a check that the smaller trees will go ahead of them, and ultimately form finer specimens. We are an advocate of close planting at first—that is, planting robust fast-growing kinds, to protect the more delicate sorts, until such times as these last get well established; but out of this mode of planting springs an evil, and it is this: that we seldom find two individuals out of ten, that have the sense—or we would rather say the nerve—when the time arrives that the nursers should be removed to do it; they say, O, just let them stand another year, they look so fine; and this state of things goes on until the whole becomes an unmeaning mass of tall, one-sided objects.

For lawn planting there are certain kinds of deciduous trees, more suitable for that purpose than others, owing to their symmetrical mode of growth, color and form of the foliage, and as not being usually attacked by insects; among these, and having globular-formed heads, we name American and English Beeches, Norway and Scarlet Maples. The European Hornbeam, together with the Magnolia macrophylla here and south of us, may properly be ranked in this group; the English field and Sycamore Maples are also very desirable for lawns. Where shade is wanted on short notice, the American Silver Maple is a good tree to plant for that purpose. Then as favorites among the erect or conical-growing kinds we have the Tulip Poplar, Sweet Gum, Kentucky Coffee, Maiden Hair-tree, (Salisburia adiantifolia,) and the Cucumber tree of Virginia, (Magnolia acuminata,) and last, though not least, is the Angular-stemmed Poplar, of rapid growth, and when planted a reasonable distance from a building of square outline, sets it off to great advantage.

Stir up the surface of the Tulip and Hyacinth beds; all roses that have heretofore been neglected, should be pruned; the H. Perpetuals, Bourbons and Tea roses will flower better if cut well back, while the Noisettes, Prairies and Ayrshires should be left with longer canes. Where herbaceous plants have been standing long in one place, the present month is a good time to divide and make a new plantation.

Towards the middle of the month, prepare to sow flower seeds in the open air, by digging the ground deep, and pulverize it well, afterwards making the surface smooth. Choose a time to sow when the ground is dry and friable; if the soil is stiff, then provide some light sandy earth, with which to cover the seed, and the depth of the covering will have to be regulated much in accordance with the size of the seed: some will require to be covered an inch or more, while others will have to be sown on the surface, and the bruising of the clods while pressing the surface smooth, will be sufficient covering; the object of pressing is to keep the earth close to them, so that they may not perish from droughts.

Amateur Florists.

Messrs. Editors American Farmer:

Your remarks on "an occupation for amateur florists" are timely and suggestive. In England many of the most noted hybridizers and producers of new varieties are amateurs; in many instances, country clergymen. Many of the finest strains of seed of Primulas, Pinks, Picotees, Cyclamens, &c., known in the trade, are collected from growers who earn their living in factories, and cultivate their gardens as a recreation. May we not hope to see this healthful recreation more general among our American operatives? Much has been done in England to this end by competition shows, open only to this class of growers; shows in which the specimen plants were brought out by little girls and old ladies, and grown in all sorts of old broken crockery ware, tin cans and cigar boxes. Such a show would be very interesting, especially if attended by professional men ready to impart information to the growers, and give them hints for future improvement. Could not our society do a good thing by offering prizes for plants grown in city windows and yards, and by persons not trained gardeners?

W. F. Massey.

Treatment of Roses.

Mr. James Pentland in his new catalogue for 1876, a well-filled, compact volume of 44 pages, says on this topic, that many persons are disappointed after they plant a rose, in not seeing it flourish and bloom afterwards, never dreaming that the fault is with themselves; for some think that all that is necessary is just to make a hole in the ground and *stick it in and cover it up*, whereas there is no plant that likes good treatment better than the rose, and none that will so amply repay for generous treatment.

Roses, in general, grow best and bloom finest in a rich, strong soil, and, where the soil has been exhausted in gardens long under cultivation, a good plan is to trench the same, or where this cannot be conveniently done to get some virgin soil and incorporate well with the other. We have tried this in small gardens with good success by removing about one-half of the exhausted soil and replacing it with (what would be termed) clay.

Landscape Gardening.

In the proceedings of the Massachusetts Horticultural Society we find the following essay on this subject by Mr. James Cruickshanks, to whom an award was made for it:

The principles upon which Landscape Gardening is founded are intended to produce unity of design with harmony in execution, and also picturesque beauty, and where these are not combined the grand object in view is not attained.

It is necessary to consider the location of the house, with all its surroundings, the size of the place, also the views to be obtained from it, whether they are distant or circumscribed, of wood or water, tame or romantic, of mountain

or meadow, of sea or land. An estate commanding such views requires very different treatment in the arrangement, from one where the house is imbedded in a forest with only space enough to get a small lawn, and consequently without distant views. In forming the component parts of a good landscape, much also depends upon the character of the scenery in view, for if the sea can be seen on the one side, and a mountain on the other, the planting would require to be bolder and more decided than if the only views to be obtained were a meadow with its flocks and herds.

These different circumstances would require to be borne in mind by any one who undertakes such work as the laying out and decorating a suburban residence in the style now practised in Landscape Gardening. Much may be learned by the attentive observer from studying the natural forests, whether on meadow or mountain side, the natural groups being, in many cases, so arranged as to give the landscape a very pleasing effect, so that little improvement could be made by the most skilful artist.

The first thing that requires attention is to have the ground properly drained and sub-soiled, and afterwards graded and enriched; also to have the places marked off for groups of trees which it is intended to plant. You will then be ready to sow the grass seed, and must be sure to procure the best mixture to produce a good lawn.

There are many opinions on this point, but after long experience with various mixtures, the kinds I have found to give the best satisfaction are as follows: eight quarts of red top, two quarts of fine top, three quarts Rhode Island bent and three quarts of Kentucky blue, adding half a pound of white clover. These grasses when kept short will soon make a fine lawn, which is one of the best components of a good landscape. Some soils require more seed than others, but the proportion will be the same whatever the quantity required.

It is difficult to give a design for any supposed place, as almost every one differs somewhat from its next neighbor; but assuming the ground to be nearly level, or slightly undulating, with a public road in front, and rather sloping to the road than otherwise, placing the house about two-thirds of the depth of the property towards the back, will give a good opportunity to have the necessary buildings, such as the stables, carriage-house, ice-house, etc., behind the mansion where they can be shut out from view, if desired, by irregular groups of planting, which could lap over each other and thus secure privacy. This arrangement would afford space for a fine lawn in front, with small irregular clumps of trees and flowering shrubs near the road, making the lawn look as large as possible and giving views of pleasant objects beyond.

The house being located as above stated, and say about one-fourth of the width of the lot from either side, with an easy curved avenue from the road, such an arrangement would give a good opportunity to get a small kitchen garden and orchard at the back of the house, with a greenhouse and grapery running about parallel with the house, and a flower garden in front of them, flowering shrubs and low evergreens forming a boundary between the flower garden and the lawn. Anything that was unsightly would thus be kept out of view, and at the same time everything required could be conveniently located.

The flower garden being a distinct department, the best effect will be produced by cultivating in it principally florist's flowers. The beauty of a lawn is lost in a great measure by introducing clumps of bedding plants through it, however artistically they may be arranged; nothing pleases the eye so well as the pure green grass, with here and there a handsome ornamental tree judiciously located.

The buildings and drive being thus disposed of, the next thing requiring attention is the planting of the boundaries in such a manner as to afford sufficient shelter on the north and west sides, these being the quarters from which our heaviest gales come, but without giving it a too formal appearance, and at the same time taking advantage of all the most desirable views that can be obtained, and this can only be accomplished by judicious grouping.

The same may be said of the south and east sides, although they may not require to be so densely planted, unless it be to hide some unsightly object; but where a view of the sea or the bold outline of a mountain can be obtained, the landscape gardener should be sure to take advantage of them. In planting, avoid straight rows, and let the outlines of groups be sinuously diversified, taking care to arrange the trees and shrubs according to their size and color, keeping the tallest at the back and the lightest shades of foliage on the most salient points. Small groups of ornamental trees and shrubs may be judiciously planted through the most distant parts of the lawn, but generally single trees are all that will be required on a small place, such as the different varieties of magnolias and double thorns, *Virgilia lutea*, tulip trees, deciduous cypress, purple beech, etc., for deciduous trees, and for evergreens, Austrian pines, Cembrian and the various species of Retinisporas, with many others that might be named.

This gives a general idea of my system of plan for any such work as the above described, but the design must be varied according to circumstances: different locations, as before remarked, requiring different treatment, and the size of the place being also an important element for consideration.

On Roads.

Mr. Meehan, in the *Gardener's Monthly*, says truly that the problem of perfect roads is yet unsolved; but as every place, large or small, has to have pathways of some kind, it is a topic which interests all.

There is but one enemy to a good road, and this is water. Some would say frost, but frost does no injury where water does not exist. If we can get any kind of material so tight or compact that it will not absorb water, it is entirely frost-proof. This is the real secret of the value of Asphalt, which is simply bituminous limestone. The rock is first broken in small pieces, then crushed fine and rolled under heat. The crushing makes innumerable small spaces into which the melted bitumen penetrates. Every air space

is thus effectually closed, and, of course, it is entirely waterproof. No frost can, therefore, affect it in the slightest degree. The danger is from high temperatures. The dark color favors a rapid absorption of heat, and the heated mass expands, and as it cools makes numerous small fissures that permit water to follow. This freezes and the disruption of the whole commences, imperceptibly at first, but in time to a serious extent. Lime alone will make a tolerably good path, if slaked before using and put down in the form of plaster; trusting to continuous rolling to press out the air-cells. Its particles are too soft to stand against heavy, sudden blows, such as from horses' feet; but for steady travel it is excellent, and very cheap. For cellar floors nothing better can be desired. It takes a couple of weeks or more to harden, but is then perfect rock. The lime floor we have described, it must be particularly noted, is not a mortar floor, but a plaster floor made of well-slaked lime and rolled.

There is not, however, much gained by these patent attempts to get over the road-making difficulties of the lime. None of them are equal to a first-class Macadam road, made of the best flint rock. Rarely is a road, said to be Macadamized, really so. To make one we must first provide for thorough drainage. Any coarse, solid stone that will lay solid will do for a foundation. As we near the surface it must be smaller, but that on the top should be no larger than almonds and the whole compactly rolled. The reason why they must be so small and no larger is this: If a stone moves ever so little under a heavy wheel, it is bound to be more or less broken; or if it does not move, if it bears the whole weight of a wheel without any support from its neighboring pieces of stone, it will be crushed to dust. But if the pieces are so small that each is compactly wedged in by others, so that any displacement of the piece is utterly impossible, it receives the heaviest weight with perfect indifference. A well-made road of this character will bear public travel for a hundred years, provided a facing of the half-inch material is added occasionally, as the little wear that takes place needs.

Removing the Blossoms from Irish Potatoes.

Editors American Farmer:

Your readers doubtless remember the article printed in your columns last summer, translated from *La Revue Agricole*, by Cadet W. W. Briggs: "Increasing the yield of Irish potatoes by removing the blossoms." At my suggestion a subscriber of yours, Mr. John Bunting, of this county, selected 12 rows in the field of his second or late crop and yesterday gave me his report. He carefully compared the yield and size of the tubers from the rows of which he had the blossoms cut as soon as they appeared, with the rows on either side, and is thoroughly satisfied that he was *well repaid* for the slight care and labor required in the pruning. The rows selected were in the middle of the patch and had no advantage in manuring or natural strength of the soil over the others, and he can attribute the result in the harvest—*fewer culls*, greater yield in size and quantity—to no other cause than the *removal of the blossoms.*

It is not uncommon to hear our potato growers say that when the Early Rose first came out, they yielded much better than they do now, and we "*had very few blossoms;*" now some time before we commence harvesting, the major part are, or have been, in full bloom. The experiment does not cost much; suppose we try it.

Theory teaches us that, in Horticulture, excessive growth of structure is incompatible with fruit production, and the formation of blossoms and seed the highest efforts of reproduction, and consequently of exhaustion. The blossom of the potato shows a disposition to increase its species by the formation of seed balls, which in their turn are rarely true *to their kind*, at the same time its fruit—the tubers developed at the root—contain the germs or eyes surrounded by plant-food in starch, for the extension of its *own family*.

If pruning the *blossoms arrests efforts at seed formation*, which it assuredly does, conserves the strength of the plant for the legitimate development of its tubers, we can readily apprehend that art may here, as elsewhere, apply the principles of *pruning with profit*.

On looking for the article from the French paper, I am reminded that a friend has borrowed the bound copy of your last year's issue, which you had the kindness to send me, and I therefore cannot refer to the precise grounds on which the Canadian explained the remarkable results which he obtained by removing the blossoms. In conclusion permit me to recommend to your subscribers a careful file of your monthly for *binding* and the *library* at the end of the year; a single reading on a rainy day will often pay well for the year's subscription.

NANSEMOND.

Suffolk, Va., March 22d, 1876.

Cultivation of Asparagus.

Editors American Farmer:

Just at this season of the year I am reminded of a method of asparagus culture which I have taken in practice, but which I have never seen recommended. The old method of planting asparagus roots deep in the ground results in a crop of tough white stalks, and a much later coming in use than if the roots were near the surface when the first rays of a spring sun would bring them into activity. The plan I recommend is as follows: Early in April or last of March make a moderate hot-bed in the usual way. Cover with glass sashes heavily whitewashed for shade from the direct rays of the sun. On this bed sow the seed thickly. In May, when the young plants are about 3 inches high, choose a damp day and draw them carefully. If for garden culture, lay off your ground in rows two feet apart, and set the plants nine inches in the row, with an ordinary dibble, pressing the soil tightly about the roots. The soil should have been previously prepared by deep digging and very heavy manuring, and if of a light nature all the better. The plants will grow right along, and cutting can commence a year earlier than if grown in the usual way. I can show a bed here grown in this way from which shoots, stout as one's finger, were cut for the table the spring following the sowing of the seeds. It is well known that asparagus

roots, though hard to kill after once established, are difficult to transplant successfully if packed and transported a distance. Frost and drought do not hurt the roots, but it is extremely difficult to pack for shipment so that they will not get slightly heated, and once heated they are done. Some years ago when the Conover was a new sort, the writer paid $300 for 30,000 roots of this variety. They were shipped about 50 miles, packed very tightly in hogsheads, and when opened were warm, but looked all right, and were carefully planted. Out of the whole 30,000 I do not think a hundred ever sprouted. In buying asparagus roots from a distance always instruct the shipper to pack in perfectly dry moss or hay. By the method detailed above, however, any one can get an asparagus bed from the seed as soon as though they bought the roots and were successful with them.

W. F. MASSEY.

Riverbank, Chestertown, Md.

Names of Sweet Potatoes.

It is not uncommon to find the same variety of fruit or vegetables known in different sections under distinct names, and the writer has been quite recently reminded of this in the case of sweet potatoes. Having ordered the past summer 500 plants of the "Southern Queen," from one of your advertisers, when they came in excellent condition, my people persisted in saying they were our "Hayman." The plants did well, yielded and kept well, and on comparing them with Hayman by taste, when baked, appearance and admirable keeping qualities, *they are the same.* In Norfolk recently, a grower was selling some very fine white *California* yams. They were our Hayman and your Southern Queen. The name is of no consequence. The variety is very valuable for family use; none for a Northern market. They are vigorous growers on land manured the previous year. Mature early, keep well all winter, and in our estimation are only excelled in quality by yams and the old Spanish. Tastes differ, we all know. NANSEMOND.

Early Sweet Potatoes.

A correspondent of a Southern paper gives the following mode of obtaining early Sweet Potatoes, which he has practiced without a single failure for 20 years:

"Early in March I make a hot bed, by setting up edgewise four planks or slabs, twelve inches wide, and driving down small stakes on the outside to keep them up. I fill this box or frame with horse manure that has been kept dry, tramping it down until it is eight inches deep in the frame. I then cover the manure with rich earth two inches deep, upon which I spread my yams or potatoes, thickly, but not upon the top of each other, and cover them with two inches of rich earth. I then raise one side of my frame six inches and cover well with four feet boards to keep off all rain until the slips are up. I almost invariably have them up in two weeks, when I take off the cover and water freely with soap suds or water. Insert the hand every few days into the manure to see if it is more than agreeably warm to the hand. If so, uncover for a few days, but do not let it rain upon them until after they are up, as they would get too hot. Slips can be obtained in this way so early that they will have to be protected from the frost, and in larger quantities from a peck than from a bushel by the usual method. If well watered slips may be drawn every week from the first of April until in July. I set them out when the ground is dry, and pour half pint of water around the slip and cover with dry earth."

Culture of the Cauliflower and Cabbage.

We find in the volume of the Transactions of the Massachusetts Horticultural Society an essay written by our esteemed occasional correspondent, Mr. W. H. White, and to which the prize offered by the Society was accorded. From it we make the following extracts:

The culture of the different varieties of the *Brassica oleracea* is so nearly alike, that directions for one will nearly as well apply to all; only a few unimportant details vary where the different varieties vary in hardiness, and when it is desired to produce young plants for a succcession of crops. For an early spring crop of cauliflowers and cabbages, the plants must be brought into condition for planting out as early as the weather will permit; and for all planting the plants require suitable age, which cannot be acquired in only a week or two, though they might be forced into suitable size, but there is a certain quality they acquire in no other way than by age. For late planting and crops, the plants are grown in the open ground. In describing the culture of the cauliflower and the cabbage it will be unnecessary to enter into details; any little modification of these can readily be made to suit varied circumstances of different varieties.

As before remarked, a first and most important essential in growing the plants, is SEED, *pure pedigree seed, sound* and *true.* If plants are not produced from the best of seed, no after culture will compensate therefor, and first-class cauliflowers or cabbages need not be expected. The cauliflower is the most advanced improvement on nature of the cabbage tribe, and unless the *best* of seed is used it tends strongly to revert; therefore procure the best seed at any cost rather than accept and use a doubtful article at a reduced price. Many fail here, at the start, from thinking to economize a little.

Growing Plants.—I will first give directions for growing plants for the later crops in the open ground—the same treatment being alike applicable to the cabbage and the cauliflower. Perhaps I should say that the most thorough course is the best, although requiring some extra labor which may seem to some unnecessary.

Seed Bed.—The soil should be generously rich, deep, and mellow, and be freshly dug and worked to a fine tilth for several inches at the surface; a sandy loam works the best for a seed bed. Unless the soil is in good heart a liberal dressing of well fined stable manure or guano should be thoroughly intermixed with three or four inches of the surface. When the ground

is thoroughly prepared, which should be in May, sow the seed in drills, six inches apart, thinly, compressing the soil over the seed. As soon as the plants show themselves, sow over them a dusting of soot and plaster to keep off the fly, and thin them, when second leaves are made, to two or three inches in a row. When the plants have made leaves as wide as an old copper cent, transplant into another bed of finely worked rich soil, freshly dug, six inches apart. This transplanting tends to give them fine bushy roots, makes the plants strong and stocky, and curtails the tap root, and when finally transplanted they are more certain of success, taking root and growing sooner and more strongly. Tolerably good success may be had without this transplanting, by thinning the plants well in the seed bed, cutting the tap root off about two weeks before transplanting, and choosing the strongest and best plants for setting where to be grown.

To produce plants for an early crop to mature in June and July, we sow the seed the first week in September, and winter them over in cold frames. The seed is first sown in a well prepared bed in the open ground, as for the late crop; in the course of four or five weeks the plants are transplanted and set deeply in cold frame beds, two inches apart each way, where they can remain, to be treated as cold frames are commonly managed, till spring; the cauliflower being more tender than the cabbages, more protection to the beds will be necessary. These beds should be located where they will be sheltered from prevailing cold winds, and be banked around, deeply, with stable and yard manure. The cold frames in which cauliflower plants are wintered need considerable attention to keep the plants in the dark the shortest time consistent with safety from cold; to give sunlight when to be had, and also as much fresh air as is safe, taking off the glass and replacing as the weather is soft or cooler, covering when cold and cloudy, and at night. Stir the soil about the plants in the frame whenever practicable, to give the plants strength. All through the winter and early spring the glass should be off as much as safe during the brightest and warmest part of the day, to strengthen and harden the plants. About three weeks before corn-planting time begin to leave the glass off nights as well as days.

Plants may also be grown, with less trouble, by sowing the seed in a hot-bed, or other structure for propagating, in January, and, when the plants have made a growth of two or three inches, transplanting into shallow boxes of soil two to three inches apart, and putting them in a warm place where they will not be forced; or they can be transplanted into another hot-bed partly spent, until it is safe to plant them in the open ground. If the plants are properly grown and hardened off, they are so hardy that several degrees of frost does not seem to affect them.

Preparation for Transplanting.—If the weather will permit, manure, plow, and prepare your ground for transplanting into, by the middle of April, or as early as it can be well and thoroughly done; make large applications of manure—ten to twelve cords—and fine and mix it well with the soil; work the soil deeply and thoroughly, making it mellow and fine with plow, cultivator, and harrow. Thorough work here decreases after-labor in cultivation. Having accomplished this preliminary work lay off the rows, according to the requirements of the variety to be planted, from thirty to thirty-six inches apart, with the hills eighteen to thirty inches apart in the row. Regard must be had to whether the after culture is to be by horse or hand; if by hand, the rows may be nearer than if the horse and cultivator are to be used. Into each hill drop about a tablespoonful of guano, chop it into the soil well, and cover two to three inches deep with fine soil, and set the plants over this.

[TO BE CONTINUED.]

Vegetable Garden.

April.—Do not, in the hurry and press of farm work, neglect the garden. We think no other department gives more profitable returns, in satisfaction, health and comfort, than this, if well laid out and well cultivated. Sow the hardy vegetables as soon as the ground is dry, including in these, Beets, Carrots, Cabbages, Lettuce, Onions, Peas, Parsnips, Radishes and Turnips. More tender sorts should wait till the ground is warmer and the nights less chilly. Of these are Lima Beans, Corn, Cucumbers, Egg-plants, Melons, Okra, Peppers, Squash and Tomatoes. Corn-planting time is early enough for these.

Hot-beds need closer attention now, when an hour's sun may burn up your plants; or when trusting to absence of frost a single night's exposure may render useless the work and patience of weeks.

Fork up Asparagus beds if not yet done. Plant Brush or Dwarf beans. Sow Beets. Set out Cabbages, Cauliflowers and Lettuce. Sow Carrots and Parsnips, also Celery in the richest part of your garden. Plant Horse-radish sets in rows. Onions and Leeks should go in at once. Plant Peas in succession. Get Potatoes in as early as the ground will admit. Sow Parsnips and Salsify. Sow Radishes for succession. If Rhubarb-beds have not been manured, do it now. Sow main crop of Tomatoes.

Peruvian Guano.

Messrs. J. J. Turner & Co., who are themselves extensive users of Peruvian guano, in the manufacture of their "Excelsior," have purchased a very large quantity, which runs very far above that now brought in in ammonia per centage, offer to sell it in lots to suit, guaranteeing its quality.—The opportunity is one which will not often be afforded those desiring to obtain a high-grade article.

The Wisner Tiger Sulky-Rake.

This implement is claimed to be very effective, and its advantages are well set forth in the advertisement of Col. Underhill. We noticed lately in the New Orleans *Times* a reference to this rake, which was exhibited by the colonel at the Great Southern Exposition in that city, with the Bickford & Huffman drill, as "perfection in its kind." It was there awarded one and the grain drill received *three* silver medals.

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Advertisements should reach us by the 20th of the month, to secure insertion in the succeeding issue.

APRIL 1, 1876.

Bills for Subscription.

With this number we send out bills to such of our subscribers as have not yet remitted for the current year, and also to others who are in arrears. Attention to these will very much oblige us. The individual sums are very small, but the aggregate is to us very considerable.

The Southern Planter.

We invite attention to the advertisement to be found elsewhere of this journal. The testimonials to its worth are well deserved, and it merits a generous support. That the foremost men in Virginia are constant contributors to its pages speaks well for it, as it does, indeed, for themselves. If every farmer in the State subscribed for it—as every one ought—the improvement in her agriculture would soon be evident; and we are sure, too, that the *American Farmer* would itself—as a co-laborer in the same cause—participate also in the good results accruing from the widened spread of agricultural literature.

Beautiful Roses.

Messrs. Miller & Hayes, of Mt. Airy, Philadelphia, having occasion to send us the small cut which illustrates their advertisement on another page, instead of mailing it in the usual way, forwarded it to us in a box of flowers, comprising amongst others many lovely buds of the roses for which this firm, as our readers have learned from previous notices of their establishment, are famous. Arranged in improvised vases they gave our sanctum a gaiety and perfume not, we confess, entirely its wont. Mr. Miller of this house, by the way, is entrusted with the charge of the Horticultural Department of the Exposition, and his selection has received the most hearty commendation from the press.

Maryland Granges.

From the Secretary, Edward Hall of B., we have a circular, of March 15th, containing a list of the officers for the present year of the State Grange; the master and secretary of each subordinate and county and district grange, with their post offices. The only changes in the State officers are the replacement as Pomona, by Mrs. H. S. Condon of Mrs. H. N. Lansdale, and in the Executive Committee, of Thos. S. Iglehart by P. A. Bowen.

During the year intervening since the last circular, the county and district granges have increased from four to twelve; subordinate granges from 148 to 161. H. O. Devries, Master of Howard County Grange, has been appointed a salaried agent in Baltimore, for the sale of products and the purchase of supplies for patrons. A warehouse has been secured at No. 90 Camden street, where the business of his agency will be conducted.

The secretary requests all granges that have not done so, to notify him immediately of any changes in their officers for the present year, giving the name and post-office address of master and secretary.

The "Centennial Grange, No. 161, of Baltimore Co., Md." has been established near Towsontown, with the following officers: Master, Col. Dan'l Jenifer; overseer, George Yellott; lecturer, Dr. G. M. Bosley; stewart, D. M. Matthews; assistant stewart, Wm. E. Stansbury; gatekeeper, J. F. C. Talbott; chaplain, S. Merryman Anderson; secretary, Edward Pearce; treasurer, Edward Jessop; assistant lady steward, Mrs. D. M. Matthews; Ceres, Mrs. Col Jenifer; Pomona, Mrs. George Yellott; Flora, Miss E. Talbott.

Books, Catalogues, &c., Received.

To ALFRED GRAY, its Secretary, we are indebted for *The Fourth Annual Report of the Kansas State Board of Agriculture*, a very complete exhibit of the extent of the interests and resources of that State, copiously illustrated with maps, diagrams and engravings, and forming a large and handsome volume, the contents of which are as varied as useful. A prominent paper is a "sketch of Kansas agriculture," by Prest. J. A. Anderson of the State Agricultural College, as incisive in its style as instructive in its statements.

From THE ORANGE JUDD CO., New York, we have *The Shepherd's Manual*, by Henry Stewart, pp. 252.—Price $1.50.

This is a work that we can most unreservedly commend, not only as filling a vacancy long felt in American agricultural literature, but as so well supplying it that it was worth some delay to wait for it. The author is evidently a practical man, thoroughly conversant with the

details of sheep husbandry, and his treatise deserves wide circulation. The chapter on breeds of sheep gives an amount of information which it would be hard to find anywhere else in so complete and available a shape.

From SOMER, POTTS & Co., Philadelphia, through Medairy & Bowers, Baltimore, *How to write Letters*, by J. Willis Westlake, A. M. Price $1.00. And *Literature for Little Folks*, by Elizabeth Lloyd, M. S. Price 50 cents. The first is a very useful and tasteful little volume containing much information on points on which many are very ignorant in the art of letter writing. It is not a mechanical "Letter writer," but a production of literary merit, giving beyond mere forms, and dealing with the subject in a philosophical way, whilst supplying much matter of general interest and usefulness.

The other consists of selections from standard authors, with lessons on each piece in objects, words and thoughts, and will be found valuable in training children to habits of observation.

From E. W. BUSWELL, Treasurer and Librarian of the Massachusetts Horticultural Society, we have *Part II. of its Transactions for* 1875, *and the Schedule of Prizes for* 1876. Upon the former we have drawn already in the two papers transferred to this No. of the *Farmer*.

From JOHN SAUL, Washington, D. C., *Catalogue of Plants for* 1876, a substantial volume, handsomely gotten up, including everything new, rare and beautiful in the plant way, and with a well-executed plate of the new Tea Rose "Duchess of Edinburgh."

From MILLER & HAYES, Mt. Airy, Phila., *Rose Catalogue for* 1876, comprising all the newest and most desirable kinds in cultivation in this country and Europe.

From ELLWANGER & BARRY, Rochester, N. Y., *Descriptive Catalogue of Ornamental Trees, &c.*—This is very full and complete, and represents, probably, the largest collection in the United States.

From WM. D. BRACKENRIDGE, Govanstown, Balto. Co., Md., *Catalogue of Fruit and Ornamental Trees, Shrubs, &c.* Mr. B. is devoting himself more exclusively now to the nursery business, and his stock comprises everything useful and beautiful in that line, and grown with his usual care.

From THE DINGEE AND CONARD Co., West Grove, Penna., *The New Guide to Rose-Culture.* This is not only a catalogue of the extensive collection of Roses of this firm, but it contains a large amount of useful information on their management.

From ARCHIBALD BRACKENRIDGE, Govanstown, Md., *Catalogue of Greenhouse and Bedding Plants, &c., for* 1876.—This is the first issue of this gentleman, but his collection is varied and extensive, and parties in want of plants of almost any kind, whether old standard favorites or newer introductions, will find them here.

From W. F. MASSEY & Co., Chestertown, Md., *Catalogue of Plants for Spring of* 1876.—This is the last time this house will issue its catalogue from Chestertown, and in announcing the intended removal to Baltimore, offer plants by mail at very popular rates.

From J. J. H. GREGORY, Marlboro', Mass., *Catalogue of Vegetable and Flower Seeds for* 1876.

From CROMWELL & CONGDON, Baltimore, *Catalogue of Flower and Vegetable Seeds, Fruit and Ornamental Trees, Roses, &c.*—This firm, in connection with their Agricultural Implement House, are the proprietors of the old-established Patapsco Nurseries, and offer a large stock of trees and plants, as well as of seeds.

From J. BOLGIANO & SON, Baltimore, *Illustrated Catalogue and Guide to Cultivation of Kitchen Garden.*—The reputation of this house is widely and deservedly known for the quality of their seeds.

From JAMES PENTLAND, Baltimore, *Catalogue for* 1876 *of Roses, Hot and Greenhouse Plants, &c.* Mr. Pentland is an authority on roses in this latitude, and raises large numbers of them, as well as other desirable plants.

From ROBT. J. HALLIDAY, Baltimore, *Catalogue for* 1876 *of Bedding and Greenhouse Plants, Roses, &c.* Also, *Mailing Lists.* Mr. H.'s collection is very large and complete.

Utilizing Night-soil and Applying Liquid Manure.

We are indebted to Captain R. E. Duvall, of Harford Co., Md., for a valuable contribution on the saving and manipulation of the waste of cities,—a subject of such pre-eminent importance that the demand for a solution of the problem of its disposition cannot much longer be resisted. We had hoped to give in this issue some liberal extracts from this paper, the length of which may forbid our presenting it entire, but we find from the pressure upon our pages that we will not be able to do so.

Not long since we had an opportunity of inspecting an invention which promises to very largely do away with the trouble ordinarily experienced in applying liquid manures and the crude contents of city sinks. The liquid manure carts, as usually built, work slowly, and distribute irregularly; and the mixing and composting of night-soil with ashes, earth, &c., especially as practiced by private parties, is very uncertain of results. It is troublesome to handle, and requires such a considerable time to become dry enough for use that very few who can conveniently obtain supplies of it persevere in its use.

Mr. Geo. F. Page, of the well-known firm of Geo. Page & Co., who, on his farm on the old Frederick road, a few miles from this city, deserves the credit of making not one but many blades of grass grow where *none* grew before, and who is possessed of an inherited genius for mechanical invention, having experienced the trouble in composting contents of the privy vaults of the city, conceived the idea of applying them in their unmixed condition directly to his grass lands, and he soon hit upon a method of accomplishing this quickly and economically.

The sinks in this city are now emptied by a pump, of novel construction, and their contents carried at once either into large tanks on trucks, or into barrels, which are hermetically sealed, which can be transported without any inconvenience, and which, when emptied, are returned to be refilled.

Mr. Page's contrivance consists of an iron cylinder, to the ends of which wheels have been attached, and which is filled from these barrels as they are received from the city. A large manhole with a strainer permits the contents of the barrels to be emptied at once into the cylinder; the strainer is removed, and a closely fitting door shuts over the feed-hole. Along the whole length of the top of the cylinder (as it is being filled) is a row of inch holes; as soon as the machine is loaded (it carries about five barrels, and two horses readily draw it) it is hauled to the spot designed to receive the manure; a bolt is drawn, and the cylinder makes a half revolution, bringing the holes below, and the distribution begins, the jarring of the motion producing enough vibration to insure the regular delivery of the contents of the machine. The quantity applied may be regulated by closing some of the holes, or allowing all to be open.

This machine seems to us to offer the most simple method of applying this material that we have yet seen. Of course the application of a fertilizer of this strength must be made with some precaution, which will suggest themselves to all.

The expense of the application is very small compared with the heavy cost of the labor necessary to compost it; and to farmers and gardeners near towns, who can secure supplies of this material, the plan offers great advantages. For vegetables in rows, the facility of application is very great; and when deemed desirable to dilute the fertilizer, it may readily be done by turning a stream of water into the cylinder. Mr. Page has not patented his machine; but the facilities of his establishment would enable him to supply parties cheaper than they could probably build it themselves, and more to their satisfaction.

The Planet Drills and Hoes.

We have just received a letter on other business from Mr. James M. Rudasill, of Shenandoah Co., Va., in which he thus writes of these implements, elsewhere noticed and advertised in this issue: "If you remember, I purchased through your agency one of S. L. Allen & Co.'s Planet Jr. Combined Machines, and after a whole season's careful trial, I pronounce it as far exceeding my expectations. It is a perfect wonder to all who have seen its operations."

The Agricultural College in the Legislature.

The Honorable John Carroll Walsh, of Harford county, on behalf of the Committee of Agriculture, obtained leave from the Senate to introduce a bill "To establish at the Maryland Agricultural College an Experimental Station for the Analyzation of Fertilizers and such other researches as may advance agricultural pursuits." So far as we have seen, however, the bill has not been offered.

Such a station in capable and disinterested hands is exactly what is needed; but unless the organization and management of the College are so changed as to secure permanence of design and efficiency of work, this adjunct would be worse than useless. In the investigations expected of such stations the highest skill is needed, and any other would inflict positive injury on our agriculture.

In the House of Delegates, when the supplemental appropriation bill for 1876 was under discussion, a motion was made to appropriate the sum of $2,000, or as much thereof as may be necessary to be expended by the Governor, Comptroller and Treasurer, to buy out the interests of the stockholders in the College. This was rejected, as was an amendment providing that no money should be paid the College "except upon such terms and conditions as may be mutually agreed upon by the stockholders, on the one part, and the trustees, who are the representatives of the State's interest, on the other part, to wit: the Governor of the State, the Principal of the State Normal School, the President of the Senate, and the Speaker of the House of Delegates, to the end that the College may be reorganized, so as to fulfill the purposes for which it was originally established, and better conduce to the advancement of agriculture in the State." The usual appropriation of $6,000 was stricken out, and a motion to give a reduced amount of $4,500, with a proviso identical with that quoted above, was defeated: the vote being 18 in favor to 49 against —on a call of the yeas and nays.

The annual appropriation of $6,000 was also struck out of the appropriation bill for 1877.

Whether the Committe on Education of the House will grant the College any part of the fund of which it has the distribution, we are not yet advised. That Committee has reported, however that it is "clearly of opinion that Colleges should not be given extravagant appropriations for doing the legitimate work of grammar schools," and have asked to be instructed to bring in a bill providing conditions upon which all Colleges shall receive State aid.

Our Correspondents.

We think the number and ability of the communications in this number will attract the notice of every intelligent reader of the *Farmer*. The paper of Mr. Holman is one of peculiar interest, and that of Prof. Wilson, whose own eminent position as a chemist gives the weight of authority to everything from his pen, is timely and valuable. We are compelled this month to leave out a number of papers for want of space,—among others, articles from Dr. D. Stewart, Mr. Needham and others.

Sights in the Great Metropolis.—No. 1.

BY JANE BOSWELL MOORE BRISTOR.

We left Philadelphia for New York, on the last day of the old year, choosing the New Jersey route through Long Branch. Over the low growth of underbrush, it was easy to see the stretch of level country, varied as we neared the sea by patches of dazzling white sand, contrasting with the dull gray of the sky. We looked to earth for brightness and above by strange paradox for gloom. Between Long Branch and Seabright are many cottages, and the Highlands, marked by Lighthouse, two miles beyond,—the latter being the highest land on the New Jersey coast. We passed the neat stations, large summer-like hotels, and, farther on, cottages in light tints, much the same as we find in Canada, out of Quebec. From the piazzas round these, the balconies, verandahs and plainer porches, what views seaward! what cool refreshing breezes, and, in the breakers beyond, life-giving vigor and health. On the beach was a schooner which, in fog and storm, landed here, instead of Philadelphia. Turning away from picturesque scenes on the left, eyes are strained to catch the first glimpse of the sea, its long wall of surf rolling in flecked with foam. Taking the boat at Sandy Hook, we reached New York in the middle of the day.

The grave-yards round old Trinity and St. Paul's churches, on Broadway, are full of quaint, time-worn stones. In the portico of St. Paul's, we read: "The State of New York caused the remains of Maj. Genl. Richard Montgomery to be conveyed from Quebec, and deposited beneath this monument, July the eighth, eighteen hundred and eighteen." Above is the inscription: "This monument is erected by the order of Congress, twenty-fifth of January, seventeen hundred and seventy-six, to transmit to Posterity a grateful remembrance of the patriotic conduct, enterprize, and perseverance of Maj. Genl. Richard Montgomery, who, after a series of successes amid the most discouraging difficulties, *Fell* in the attack on Quebec, Dec. thirty-first, Seventeen hundred and seventy-five. Aged thirty-seven years."

Many distinguished dead are buried in these church-yards: the brave Lawrence, whose dying words were "Don't give up the ship;" Thos. Addis Emmet, the Irish patriot; Count de Rochambeau; the unhappy Charlotte Temple, and names illustrious in the Revolutionary war.

Looking into business streets on either side of the great thoroughfare, the growing wonder is, how all are able to bear the demands of constant competition and rival energy. Many are not, but real merit is as likely to be appreciated here as elsewhere. There is more regular system in the conduct of affairs, which increases their working efficiency. Thus the publishing house of Schermerhorn's Educational Monthly is also the Teachers' Institute or Bureau, and the general headquarters of everything in the educational line. The immense correspondence of its managers with schools of different grades, throughout the land, has enabled them to supply these with *twenty thousand* well-accredited teachers. Think of the power and influence expressed in this one item. Whatever improvement is made in any department of education, from a classic to an inkstand or sponge, you may learn of it, and examine its workings here,—the catalogue of such objects having passed through ninety editions. Nor is physical health, without which intellectual culture is unavailable, neglected. The most portable, efficient and popular health lift of the day, weighing only eighteen, but lifting from fifty to a thousand pounds, is the work of one of the firm. You would hardly imagine that the heads leaning over desks around you, are really shaping the characters and moulding the future of tens of thousands of the youth of America. It is cheering to know that in spite of organized opposition, the bill compelling the instruction of children has become a law in New York. Every citizen of our country has a right to demand, not only for himself, but his neighbor, a common school education, by which I mean, knowledge of reading, writing and the ordinary English branches. The safety of the Republic lies in this. It is the ignorant who are fanatical, violent, prejudiced, turbulent, and insurrectional. The thieves of New York cost the people yearly, nearly seven millions of dollars.

Poverty and vice crowd human beings into tenement houses, having fronts of fifty feet, a depth of one hundred and fifty, and five floors, into which one hundred families are gathered. There are twenty thousand tenement houses, which, in overcrowding and horror, far surpass the most densely peopled portions of London. It is the industrial classes who are thus housed and imperilled. Ten thousand children under fourteen are adrift in the streets of the city, and if to these were added all the vagrant and neglected little ones, in double file three feet apart, the procession would be eight miles long. "Seventy-five hundred grog shops consume fifteen millions of dollars yearly, three dollars in every ten coming from the pockets of the tenement classes." The five millions thus spent would more than provide a good home for every vagabond child.

How they are Doing in Virginia.

A correspondent of the *Richmond Whig* writes that the second half of the fourth year of the Virginia Agricultural and Mechanical College began on the 24th of February with more than sixty new students—the total number in attendance being two hundred and fifty; and he adds, that "the Sleepy Hollow into which the first professor of the new college penetrated in the fall of 1873 is now becoming one of the most active little towns in the old Commonwealth, as its college is already one of the most encouraging signs for the future which the lovers of old Virginia can see within her borders."

FRUITS AT THE CENTENNIAL.—A large space has been allotted for a *continuous* exhibition of fruits, which will begin May 10th. July 1st will be devoted to Southern fruits, and September 11th to the American Pomological Society. Parties having fruits may send them on at any time, with the assurance of their finding a place.

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JUST AS WE GO TO PRESS, we are in receipt of a valuable paper on Dairying, from Mr. Wm. T. Schofield, of Montgomery Co., Md., probably one of the most successful dairy farmers in the State.

Baltimore Markets—March 31.

The quotations below are Wholesale Prices.

Breadstuffs.—*Flour.*—Market quiet, though steady and firm. We quote: Howard St. Super, $3.75@4.25; do. Extra, $4.75@5.25; do. Family, $5.75@7.50; Western Super, $3.75@4.25; do. Extra, $4.50@5.25; do. Family, $5 75@7.25; do. do. tainted, $5@5.50; do. unsound, $4.50@4.75; City Mills Super, $3.75@4.00; do. Low and Middling Extra, $5.00@6.50; do. Rio brands Extra, $7.25@7.50; Fancy brands, $9.00; Fine, $3.00@3.50; Rye flour, $4.50; Corn Meal, City Mills, ₩ bbl. $3.00@3.25; do. Western, ₩ bbl. $2.40@2.50; Buckwheat Meal, N. Y., $1.50@1.75; do. Penna. and Md., $1.25@1.50.

Wheat.—Market firm and good grades in demand. We quote: Southern red, common to fair, $1.25@1.45; do. good to prime, $1 50@1.55; do. amber, $1 60@1.62; do. white, $1.40@1.60; Penna. red, $1.47@1.50; Western No. 2 red, $1.45@1.47.

Corn.—Southern in demand, and firm; supplies limited. Quotations: Southern white, 61@62 cents; do. yellow, 59@62 cents; Western mixed, spot, 63¼ cts.

Rye.—Market steady. Quotations 80@83 cents for good to prime.

Oats.—Heavy and inactive. We quote: Western mixed, 40@44 cents; do. bright, 45@48 cents; Southern good to prime, 45@49 cents.

Cotton.—Market strong but quiet. Quotations: Middling, 13 cents; low middling, 12¼@12¾ cents; strict good ordinary, 11¾@12 cents; good ordinary, 11¼@11¾ cents.

Hay and Straw.—Dull market for both. We quote: Hay—Cecil County (Md.) Timothy, $22@24; mixed, $17@20; Clover, $16@18; Straw—wheat, $12; oat, $13@14; rye $18 ₩ ton.

Live Stock.—*Beef Cattle.*—The cattle market for the past week was very slow owing to bad weather. Prices ranged as follows: Best on sale, 6¼@6½ cents; generally rated first-class, 5¼@6¼ cents; medium or good fair quality, 4¼@5¼ cents; ordinary thin Steers, Oxen and Cows, 3¼@4 cents.

Hogs.—Active and prices firm. Selling quotations, 10¼@12 cents.

Sheep.—Good sheep sell readily at 5@7¼ cents.

Potatoes.—Early Rose, 40@45 cents; Peerless, 40 cents ₩ bushel.

Seeds.—Timothy, $2.75@3.00; Clover, $11.77@12.00 ₩ bushel.

Tobacco.—Maryland continues to arrive quite freely, but there is a moderate demand for it principally for Bremen and Holland, and the market generally may be said to be steady, though low grades, which are still neglected, are heavy and depressed. Virginia we hear of no movement. We quote: Maryland frosted, $3.00@4.50; do. common to good sound, $5.00@6.50; do. middling to fine, $7.50@10.50; do. fancy, $12.00@15.00; do. upper country, $6.00@25.00; do. ground leaves, $2.50@7.00.

NEW ADVERTISEMENTS.

J. Bolgiano & Son.—Seeds.
Edward Melchior.—Guns and Pistols.
Stinson & Co.—$5 to $10 per day.
True & Co.—Agents Wanted.
G. P. Rowell & Co.—Advertising Estimates.
G. O. Brown.—Fowls and Eggs.
Griffith & Turner.—Implements, Fertilizers, Seeds, &c.
Joshua Thomas.—Buckeye Reapers, &c.
R. Sinclair & Co.—Agricultural Implements and Farm Machinery.
F. C. Grange & Co.—American Super-Phosphate.
S. L. Allen & Co.—Planet Drills and Hoes.
J. S Lewis.—Patent Boot.
G. C. Hicks & Co.—Tiles, Drain and Sewer Pipe.
Wm. Corse & Son.—Fruit and Ornamental Trees.
Dingee & Conard Co.—Roses.
W. & H. Spitcker.—Pratt's Astral Oil.
Baltimore Health Department.—Maryland Poudrette.
Moro Phillips.—Fertilizers for Tobacco, Corn & Cotton.
L. Giddings.—Concord Grape Vines.
Pennock Manufacturing Co.—Harpoon Hay-Fork.
J. C. McCurdy & Co.—100 Farmers Wanted.
Mullen & Hayes.—Roses.
L. R. Dickinson.—Southern Planter and Farmer.
Chas Westall.—New Jersey Agriculturist.
J. J. Turner & Co.—High-grade Peruvian Guano.
Andrew Cos.—Ammoniated Bone Phosphate.
John H. Barnes & Son.—New Inventions.
W. Whitelock & Co.—Whitelock's Vegetator.
H. P. Underhill—Wisner's Tiger Sulky Rake.
Robert J. Halliday—Plants.
W. H. Chidester—Agents Wanted.
J. M. J.—Teamster Wanted.